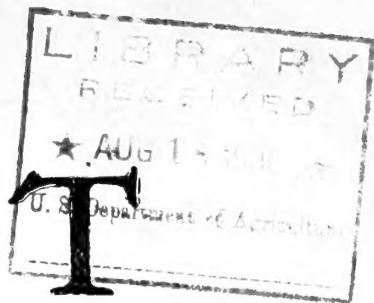


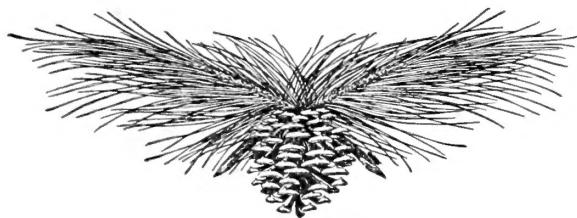
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FOREST WORKER



July, 1930

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UNITED STATES DEPARTMENT OF AGRICULTURE

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Announcements

A Bibliography of Bibliographies of North American Forestry Literature

In connection with work under way on a bibliography of North American forestry literature, intended to include titles of all forestry material published in Canada, the United States, Mexico, the West Indies, and Hawaii prior to January 1, 1930, the National Research Council and the United States Forest Service have tentatively prepared a list of existing published bibliographies of such material. This list, including some 300 titles divided under 12 heads, will be distributed to a limited number of individuals who may be able to add to it. Anyone not receiving a copy of this bibliography of bibliographies who may be able to add to it is invited to write for a copy, addressing the library, United States Forest Service, Washington, D. C.

National Shade Tree Conference to be Held in Cleveland

The Sixth National Shade Tree Conference will be held in Cleveland, Ohio, August 27-29.

The conference is composed of commercial tree experts, plant pathologists, entomologists, horticulturists, foresters, and others particularly interested in shade-tree problems. In addition to a program of papers and discussions there will be educational exhibits and demonstrations of horticultural tools and equipment. The meetings will be held in the Cleveland Public Auditorium and will be open to the public. The local committee arranging for the conference is headed by Charles F. Irish, 418 East One hundred and fifth Street, Cleveland, Ohio.

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FOREST WORKER

Washington, D. C.

JULY, 1930

Vol. 6, No. 4

State Forestry

Georgia Commercial Forestry Conference

A Georgia Commercial Forestry Conference was held at Savannah, Ga., May 26-28, through arrangement of the Georgia Forestry Association and the United States Chamber of Commerce. Frank M. Oliver, representing the chamber of commerce on the program, took as his subject the great community interest of the hostess city in forest industries. Savannah's yearly shipments of naval stores average from \$16,000,000 to \$17,000,000 in value, Mr. Oliver said; its factories supply more than two-thirds of all the rosin oil now used in the United States; its 25 wood-working plants consume annually nearly 200,000,000 board feet of lumber, employ nearly 2,000 people, and have an annual output valued at \$8,000,000; and the annual production of lumber within a radius of 75 miles of the city is approximately 300,000,000 board feet.

Gordon E. Reynolds, of the Reynolds Lumber Co., Albany, Ga., pointed out that in Georgia the annual income from the lumber business exceeds the total capital of all State and national banks. The State's lumber products, aside from naval stores, pulpwood, etc., are valued at about \$45,000,000 per year. Under proper forest management, he said, a yearly production of from 300 to 500 board feet of lumber per acre can be expected from forest lands in Georgia.

I. F. Eldredge discussed fire protection and the results of fire protection on the Suwanee Forest, which he manages for the Superior Pine Products Co., Fargo, Ga. He attributed to forest protection the fact that in the past four years the average number of trees 10 inches or more in diameter to the acre on this forest has increased from 18 to 34. He mentioned also the increase in game, attributable to the increase in natural cover resulting from fire protection, saying that according to the best information he could gather there were only three bands of deer on the property four years ago and that at the present time he knows of 22 different bands. Turkey, quail, and bear, also, have increased markedly. Mr. Eldredge emphasized the value

of fire-prevention measures and described those in practice on the Suwanee Forest, giving details as to the kinds of equipment used, cost of operation, and the annual average fire loss. On 90 per cent of the area, he said, the company has obtained the successful cooperation of cattlemen in preventing fires.

A. E. Clift, president of the Central of Georgia Railway, said that railroads purchase 11 per cent of this country's lumber output, crossties not included. In 1929 the railroads of the United States used 105,000,000 crossties, of which 90,000,000 were treated. In turn, the forest industries create an important element of railroad traffic. The Central of Georgia serves an agricultural country, yet forest products account for 20 per cent of its traffic while agricultural products account for only 13 per cent.

Charles S. Herty, industrial chemist, speaking of the slash pine as a source of pulpwood, said that he has had the wood of young untapped slash pine analyzed and that the wood has been found to contain less than 1 per cent of rosin.

R. D. Garver, of the Forest Products Laboratory, explained the desirability of selective logging as a protective measure from the standpoint of fire, community and industrial stabilization, and soil erosion, and finally as a measure to bring about more efficient use of forest land.

One of the resolutions adopted by the conference recommends that Congress make adequate appropriations for planting idle lands on national forests. Another urges the establishment of a naval stores experiment station at which the Bureau of Chemistry and Soils may develop more efficient methods of producing rosin and turpentine from the crude gum.

At a meeting held in conjunction with the commercial conference the Georgia Forestry Association adopted a resolution instructing its legislative committee to prepare a forest taxation bill designed to encourage reforestation of waste lands, with a view to having the bill presented at the next session of the Georgia General Assembly. The association again approved the idea of the Federal Government purchasing a tract of land in Georgia not exceeding 10,000 acres for the purpose of establishing and developing a station for experiments bearing on naval-stores production and timber growing, and directed its legislative committee to prepare a bill to permit the purchase.

T. Guy Woolford, Atlanta, was unanimously reelected president of the Georgia Forestry Association for the coming year. The society reelected, also, its secretary, Bonnell H. Stone, and its vice presidents, Mrs. M. E. Judd, S. W. Morgan, and W. M. Folks.

South Carolina Establishes Forest Districts

District offices have been established by the South Carolina Forestry Commission at Florence and Spartanburg. The Florence office will serve a district comprising most of the coastal plain region of the State, where the State forestry commission is now cooperating with a number of landowners in forest-fire control and other forestry work. A county-wide fire-control organization has been practically completed for Kershaw County in this district and it is contemplated that this plan will be extended to other counties. The Spartanburg district includes the Piedmont region of the State. Cooperation with timberland owners in this district has not yet been developed. D. Y. Lenhart, a graduate of the Pennsylvania State Forest School who has had several years' experience in public and private work in Pennsylvania and one year's graduate study in forestry at the North Carolina State College, is district forester at Florence. N. T. Barron, a forestry graduate of the University of Michigan who has for several years been connected with Hall, Kellogg & Co., consulting foresters, at Hot Springs, Ark., is in charge of the Spartanburg district.

As soon as the necessary funds are available State Forester Staley expects to form two additional districts, one in the Piedmont and one in the coastal plain region.

Forest Planting in Hawaii

In Hawaii, where the forest planting season extends throughout the year, the forestry division planted 297,648 trees on 20 forest reserves in the 12 months ending with November, 1929. About three-fourths of this number were white ash (*Fraxinus americana*), cajuput or paperbark (*Melaleuca leucadendron*), silky oak (*Grevillea robusta*), cassowary-tree or "swamp oak" (*Casuarina glauca*), redwood (*Sequoia sempervirens*), and koa (*Acacia koa*). In November alone 41 different species were planted. On November 15, when the soil had been loosened by rains and a gentle breeze with a velocity of 3 miles per hour was blowing from the direction of Niihau, Assistant Forester A. W. Duvel ascended in an Army airplane and broadcast 1,689 pounds of tree seed over bare and eroded ridges along the Kauai coast between Lapa Ridge and Kalalau Valley. In the same month the forestry division, with the cooperation of the Army, began to plant trees on the large eroded earth scar back of Fort Shafter. Enlisted men used dynamite in preparing holes for the trees. One-third to one-half stick of dynamite was used for each hole. By this method 10 men were able to make from 250 to 300 holes a day. Cracking the earth with dynamite put it in better condition for tree planting than if holes had been dug, Territorial Forester C. S. Judd reports.

Clarke-McNary Tree Distribution in 1929

In the calendar year 1929 Porto Rico and 14 States substantially exceeded their 1928 records in number of forest trees distributed to farmers under cooperative agreements with the Federal Government. The most striking increases in number of trees so distributed were the following: Virginia, from 31,007 to 239,325; Georgia, from 24,000 to 263,300; Montana, from 43,500 to 290,700; Alabama, from 48,600 to 303,900; North Dakota, from 47,000 to 147,500; Tennessee, from 91,800 to 205,800; North Carolina, from 175,947 to 314,200. Some of the largest distributors of planting stock under Clarke-McNary agreements, on the other hand, reported considerable decreases in the quantities distributed to farmers; New York's total fell from 9,840,000 to 7,978,000, Pennsylvania's from 9,062,396 to 6,126,219, Massachusetts' from 1,139,700 to 689,000, and Vermont's from 862,500 to 410,100. The year's total for all cooperators in this work was 25,242,697, as compared with 28,757,448 in 1928. In most cases distribution of planting stock to farmers was principally or solely to provide for timber production. Establishment of shelter belts and windbreaks was a minor purpose in 15 States and Porto Rico, had equal place with timber growing in Iowa, was the major purpose in Oklahoma, Missouri, Nebraska, Kansas, Colorado, and Washington, and was the sole purpose in Montana, North Dakota, Wyoming, California, Oregon, and Hawaii. The total number of trees distributed to farmers by the cooperating agencies, the species and ages predominating among the stock so distributed, and the approximate range of prices to the farmer per 1,000 trees, were as follows:

Maine: 131,450; northern white pine, white spruce, Norway pine, Norway spruce; 3-year transplants; \$5.
 New Hampshire: 588,163; northern white pine, Norway pine, white spruce; 3-year and 4-year transplants; \$6.50 to \$7.50.
 Vermont: 410,100; northern white pine, Norway pine, Norway spruce, Scotch pine; 2-1-year and 2-2-year transplants; \$4 to \$7.
 Massachusetts: 689,000; northern white pine, Norway pine, Norway spruce, Scotch pine, white spruce; 3-year to 6-year transplants \$7.50 to \$14.
 Connecticut: 463,300; Norway pine, northern white pine, Norway spruce; 2-year and 3-year seedlings, 2-1-year and 2-2-year transplants; \$4 to \$10.
 New York: 7,978,000; Norway spruce, Norway pine, northern white pine, white spruce, Scotch pine, northern white cedar, balsam fir, European larch; 2-year seedlings, 3-year and 4-year transplants; \$2 to \$5.
 Pennsylvania: 6,126,219; Scotch pine, Norway pine, Norway spruce, northern white pine, Japanese larch, white spruce, pitch pine, white ash; 2-year to 4-year seedlings, 2-2-year transplants; \$2 and \$5.

- New Jersey: 674,100; Norway pine, Norway spruce, northern white pine; 2-year seedlings; \$3.50 to \$6.
- Maryland: 222,039; Norway pine, Norway spruce, loblolly pine, Scotch pine, northern white pine; 1-year seedlings, 1-year and 2-year transplants; \$5 upward.
- Delaware: 29,200; Norway spruce, Scotch pine, Norway pine; 3-year and 4-year seedlings, 4-year transplants; \$2.50 and \$5.
- Virginia: 239,325; loblolly pine, shortleaf pine, black locust; 1-year and 2-year seedlings; \$3 to \$10.
- North Carolina: 314,200; longleaf pine, loblolly pine, shortleaf pine; 1-year seedlings, 2-year transplants; \$3.
- Georgia: 263,300; slash pine, loblolly pine, longleaf pine; 1-year seedlings; \$2.50 and \$3.
- Florida: 16,300; slash pine; 1-year seedlings; \$4.
- Alabama: 303,900; longleaf pine, Norway pine, loblolly pine, black walnut, slash pine, black locust; 1-year seedlings; \$1.50 and \$2.50.
- Louisiana: 357,000; slash pine, longleaf pine, black locust, loblolly pine, Red River oak; 1-year seedlings; \$1.50.
- Oklahoma: 82,200; Chinese elm, Australian pine; 1-year and 2-year seedlings; \$5 and \$10.
- Ohio: 1,512,981; Norway pine, Scotch pine, Norway spruce, Corsican pine, black locust, Austrian pine, white ash, yellow poplar, western yellow pine, sugar maple; 1-year, 2-year, and 3-year seedlings, 1-1-year and 2-1-year transplants; \$1.50 to \$8.
- Indiana: 357,120; Norway spruce, Norway pine, black locust, Scotch pine, northern white pine, black walnut; 1-year and 3-year seedlings, 2-1-year and 3-1-year transplants; \$2.50 to \$10.
- Kentucky: 78,859; black locust, black walnut; 1-year and 2-year seedlings; \$5 to \$12.
- Tennessee: 205,800; black locust; 1-year seedlings; \$1.50.
- Missouri: 2,400; oriental arborvitæ; 2-year seedlings; free.
- Iowa: 86,800; black locust, Norway pine, Scotch pine; 1-year seedlings, 5-6-year transplants; \$5 upward.
- Montana: 290,700; Siberian pea-tree, boxelder, American elm, green ash, cottonwood; 1-year seedlings; \$5.
- Idaho: 132,200; black locust; 2-year seedlings; \$3.50.
- North Dakota: 147,500; green ash, boxelder, Siberian pea-tree, American elm; 1-year and 2-year seedlings; free.
- Nebraska: 707,000; Scotch pine, American elm, Russian mulberry, Russian olive, cottonwood, honeylocust, Siberian pea-tree, Austrian pine, catalpa, green ash; 1-year seedlings, 1-1-year and 2-1-year transplants; \$10.
- Kansas: 36,200; Osage-orange, western yellow pine; 1-year seedlings, 3-year and 4-year transplants; \$10 upward.
- Wyoming: 43,376; western yellow pine, cottonwood; 2-year seedlings, 2-1-year to 2-3-year transplants; \$10 upward.
- Colorado: 165,300; western yellow pine, honeylocust, American elm, Douglas fir; 2-year seedlings, 2-1-year and 3-1-year transplants; \$10 upward.
- California: 34,860; Monterey pine, western yellow pine; 1-year and 2-year seedlings; \$5.
- Hawaii: 200,900; redwood, red gum, paperbark, highland ironwood, swamp gum, swampmahogany; ½-1-year transplants; \$6.60 to \$25.
- Washington: 44,800; black locust, Chinese elm; 1-year to 3-year seedlings; \$2.50 upward.
- Oregon: 124,100; western yellow pine, black locust, green ash; 1-1-year and 1-2-year transplants; \$2.50.
- Michigan: 891,630; Norway spruce, white spruce, northern white pine, Norway pine, Scotch pine, jack pine, Austrian pine; 1-year to 4-year seedlings; \$3 upward.
- Wisconsin: 670,575; Norway pine, northern white pine, Norway spruce, Norway pine, Scotch pine; 3-year and 4-year seedlings, 2-2-year transplants; \$4 to \$8.
- Porto Rico: 621,800; cigarbox cedar, saman, pochote, mahogany, Australian pine, capa blanca, guama piñon; 3-month to 12-month seedlings; free.
- Two other States, West Virginia and South Carolina, were operating forest nurseries under agreements with the Federal Government in 1929 but had no planting stock available for distribution to farmers in that year.
- In addition to the number of trees distributed to farmers, the cooperating agencies distributed 18,514,890 trees for planting on private lands other than farms and provided 23,964,414 trees for planting on State lands. Thus the cooperators distributed in all 67,722,001 trees, or \$43,290 less than in 1928.
- In a few cases forest planting stock was produced by State agencies not having cooperative agreements with the Federal Government.



Alliance, Ohio, started a municipal forest plantation this year, the Izaak Walton League providing labor for the planting of 12,000 trees. At Canton, Ohio, members of the league themselves planted 5,000 trees on the city's sewage disposal farm.



John A. McDermott, for the past 10 years president of the Cortland County (N. Y.) Sportsmen's Association, offered a day's services as tree planter and instructor in tree planting without charge this spring to any Cortland County landowner or organization placing an order with him for 100,000 State-grown trees. Four other members of the association joined in Mr. McDermott's offer, which included the use of his car.

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New York State Nurseries Make Record Spring Distribution

New York's State forest nurseries sent out 23,000,000 trees for planting in the spring of 1930, exceeding by 3,000,000 their record-breaking spring distribution of last year. About 4,500,000 of the trees went to the planting of some 4,000 acres of county forests, in 16 of the counties that submitted county forest programs this year for approval under the law providing for State aid in the establishment of county forests. Otsego County made the largest county forest plantation, with 1,000,000 trees. The other counties active in county forest planting this spring, with the number of trees planted by each, were as follows: Lewis, 607,000; Erie, 510,000; St. Lawrence, 407,000; Essex, 400,000; Jefferson, 308,000; Onondaga, 213,000; Schoharie, 200,000; Chautauqua, 200,000; Oswego, 145,000; Madison, 105,000; Oneida, 100,000; Steuben, 100,000; Montgomery, 80,000; Seneca, 30,000; Cattaraugus, 30,000.

Shipments of State-raised trees went out to more than 2,500 individuals, municipalities, organizations, and industrial concerns. For planting four areas of abandoned farm land recently acquired by the State 2,700,000 trees were requisitioned.

T. C. Luther Protects His Forests from Fire and Pests

Thomas C. Luther, who for several years has been planting more than 1,000,000 trees a year on his 10,000-acre estate in Saratoga County, N. Y., is substituting forest protection work for planting in 1930. With his son, Thomas F. Luther, he is brushing out and widening the 35 miles of roads on the estate and building fire lines around his various plantations. In addition the Luthers are eradicating currant and gooseberry bushes in order to protect northern white pine from blister rust and are taking measures to eradicate the white pine weevil.

Besides more than 5,000 acres of Norway pine, northern white pine, and Scotch pine plantations ranging in age from 1 to 15 years the Luther property includes several thousand acres of mature timber, which is under scientific management.



The New York Legislature has proposed a constitutional amendment providing for the appropriation of \$19,000,000 over a period of 11 years for establishing forest nurseries and for acquiring land and reforesting it. Suitable lands within the forest preserve counties but outside the Adirondack and Catskill parks would be eligible for purchase and reforestation under the proposed amendment. The proposal will be decided upon by popular vote if it is approved by the next legislature.

New Porto Rico Laws Permit Acquisition of National and Insular Forests

An act of the Legislature of Porto Rico approved April 12, 1930, abolishes the limitation on the acreage that the United States Government may purchase on the island for watershed protection, tree production, and other purposes. A second recent act authorizes the insular department of agriculture to acquire land for insular forest reserves by purchase or by condemnation. Lands suitable either for timber production or for watershed protection may be acquired under this law. The maximum price is set at \$20 per acre. The acquisition fund is to be made up of receipts from sales of products of the existing reserves, receipts from sale of isolated lands controlled by the insular division of forestry, and any unexpended portions of the division's annual appropriations.

A third act, designed to encourage the growing of timber on watersheds of rivers, provides that the insular commissioner of agriculture may classify as auxiliary insular forests privately owned lands at least 50 cuerdas (50.5 acres) in extent and not less than 1,000 feet above sea level which are devoted to growing timber either of natural growth or planted. Tree-growing operations on such lands will be supervised by the division of forestry, and the lands will be exempt from taxation so long as they remain classified. Owners will retain the privilege of removing timber needed for use on the property.

New York Amends its Forest Tax Law

An act of the New York Legislature approved this year extends to all forest plantations in the State the provision, previously applying only to forest plantations established since January 1, 1920, for assessment of reforestation land on the basis of its value exclusive of the value of the trees. It adds the proviso that land classified under the tax laws as reforestation land shall at no time be assessed at a valuation higher than that made when the application is acted upon. This provision is made retroactive on condition that a new application for classification is filed by the owner and is approved. The act also eliminates the provision permitting an owner to appeal from the decision of the assessors to the conservation commission in case of dispute as to the stumpage value of wood or timber on any classified land.



The first hearing held under the Oregon forest taxation law of 1929 has resulted in the classification of 97,955 acres of land in Clatsop County as reforestation land subject to an annual fee of 5 cents per acre only, with a yield tax of 12½ per cent due when the timber crop is harvested.

Massachusetts State Forester May Require Town Forest Wardens to Maintain Patrol

Massachusetts has emerged from an exceptionally severe spring fire season with a new law under which the State forester may require any town forest warden to maintain a fire-prevention patrol in the forests of his town during periods of extreme drought. The expense of such patrol, like that of fire-suppression work done by town wardens at the direction of the State forester under provisions of a law enacted in 1920, is to be borne solely by the town if the town's valuation is as high as \$1,250,000; in the case of a town having a valuation below that figure, if the expense of the patrol and of fire suppression in any one year exceeds one-twentieth of 1 per cent of the town's valuation the State will pay half the surplus, up to a maximum of \$250 a year.

This law, recognizing fire-prevention work as an activity no less important than fire suppression, has as one object the protection of a town already maintaining forest patrol against the spread of fire from neighboring towns that have not adopted the practice of patrolling their forests.



Since last summer a headquarters building has been erected and equipped in each of the 14 fire districts of Michigan. At each building two fast trucks equipped with tools and materials needed in fighting forest fires are held in readiness to answer calls from wardens. Truck drivers are on call 24 hours a day during the fire season. The headquarters buildings are located at Ewen, Baraga, Marquette, Crystal Falls, Escanaba, Trout Lake, Newberry, Boyne City, Atlanta, Mio, Rosecommon, Traverse City, Baldwin, and Gladwin.



The life of the commission created by the New York Legislature in 1929 to investigate reforestation conditions in the State and report to the legislature by March 15, 1930, has been extended by a year. Enlargement of the commission by one member has been provided for by the legislature.



A county forestry association was organized in March of this year by private citizens of Wilkes County, N. C., acting on their own initiative. The association, which now has a membership of 50, is interested in county and State forests and in State parks. It advocates the use of lands reverting to the county as county forests. Officers of the association are T. B. Finley, president, and H. C. Landon, secretary.

Railroad Employs Wardens and Special Crews to Burn Safety Strips

Five wardens recommended by Richard R. Houpt, district forester of the cornplanter district of Pennsylvania, were hired by the Pennsylvania Railroad this year to direct the burning of safety strips along its lines in that district. Each warden organized his own crew of from five to seven men. (One warden had a crew of 16 men while clearing the back line.) The season's work was the burning of 35 miles of safety strip between the New York State line and Tionesta, Pa. Four crews which over most of their sections had an old road from which to burn burned 24.5 miles of safety strip at an average cost of \$20.40 per mile. The fifth crew cleared 12 $\frac{3}{4}$ miles of line at an expense of about \$27.43 per mile and burned 11 miles at a cost of about \$21.56 per mile. Cost figures for safety-strip burning in each case cover a little time spent in fighting fire. The crews made an average of 1 mile of safety strip per day. They did the work as early as weather permitted, between March 17 and April 29. If men regularly employed by the railroad had been assigned to this work, District Forester Houpt remarks, it would almost certainly have been deferred to a less favorable season because of the track-repair work always necessary in early spring.



Organization of seven new timber-protective units in Georgia brings the State's total to 32 at the beginning of the new fiscal year, on July 1. Private funds totaling \$89,000 have been budgeted for expenditure during the year in protecting the 1,383,000 acres of land included in these units. According to figures of the Georgia Forest Service the annual cost of protecting forest land in that State averages about 4 cents per acre. Timber owners who organize protective units and use recommended methods of fire prevention are reimbursed from Federal and State funds to the extent of 30 cents on the dollar.



The Pennsylvania Department of Forests and Waters reports shipment of 9,250,000 State-raised forest tree seedlings for planting in the spring of 1930.



The International Log Rule has been recognized by an act of the New York Legislature as the standard for measuring logs in that State.



Sale of timber products in Jasper County, Tex., in 1929 brought an income of more than \$4,000,000, according to figures compiled by the Jasper Chamber of Commerce.

Forest Nurseryman Feeds His Enemies

Birds that attacked the 1929 crop of pine seedlings in the Texas State forest nursery readily accepted a substitute meal of oats that was offered to them by the nursery superintendent, V. V. Bean. When scarecrow and shotgun had been tried without success Mr. Bean scattered some oats in the paths between the nursery beds. The birds soon found and devoured the oats, and then flew away almost without touching a seedling. Oats were scattered in the nursery paths every day thereafter with the same results until the seedlings had passed the tender age at which they were attractive to the birds. One bushel of oats gave protection for the season.



Virginia is making a special effort to restock its streams with fish and its forests with game. The State game commission has established a system of fish nurseries and plans to distribute deer and wild

turkeys on national forests in Virginia, on areas selected by the forest supervisors. To provide food for game the commission will have buckwheat and rye planted on old fields, and to protect it the State will put a bounty on wilecats. Herbert K. Job has been employed to tour the State as a lecturer on wild-life conservation, using lantern slides and motion pictures.



The West Virginia State forestry organization distributed 200,000 forest trees for planting this spring of which 16,000 were grown in a temporary State nursery and the remainder were purchased outside the State.



Increased demand for planting stock to be used in establishing shelter belts on North Dakota farms resulted this spring in shipment of 170,000 trees from the State forest nursery to 360 individuals.

Education and Extension

Institute of Paper Chemistry Established at Lawrence College

An institute of paper chemistry, a graduate school for the training of chemists in the pulp and paper industry, has been established at Lawrence College, Appleton, Wis. Wisconsin paper mills cooperating with the college in establishing the institute have subscribed \$300,000 to maintain it for five years. Anonymous donors have given \$15,500 to establish a research library and pay the salary of a librarian, and several paper companies and allied industries have given fellowships of \$500 a year each. Henry M. Wriston, president of Lawrence College, is director. Otto Kress, who was at one time in charge of the pulp and paper section of the United States Forest Products Laboratory and has recently been superintendent of manufacture for the Thilmany Pulp & Paper Co., Kaukauna, Wis., is technical director. The faculty includes 7, 3 on full time and 4 on part time. Harry Fletcher Lewis, at one time research chemist for the National Aniline Chemical Co., Buffalo, N. Y., is professor of organic chemistry. Hjordes Roseth, Swedish expert in paper chemistry and research bibliography, is librarian. Courses are offered leading to the degrees of master of science and doctor of philosophy. The board of trustees includes Ernst Mahler, a vice president of the Kimberly-Clark Corporation, Neenah; Monroe A. Wertheimer, president of the Thilmany Pulp & Paper Co., Kaukauna; D. Clark Everest, vice president and general manager of the

Marathon Paper Mills at Rothschild; Hugh Strange, president of the John Strange Paper Co., Menasha; D. K. Brown, vice president of the Neenah Paper Co.; and L. M. Alexander, president of the Nekoosa Edwards Paper Co., Port Edwards.

North Carolina State College Expands its Forestry Work

The department of forestry established by the North Carolina State College on February 1, 1929, with J. V. Hofmann as head, is to expand into a forest school at the beginning of the new year in the fall of 1930. In the past year the department's enrollment included 71 regular forestry students and 13 seniors in the School of Agriculture who were registered for a course in principles of forestry. The college graduated 17 men with forestry degrees in 1930, every one of whom was on the honor roll of the class.

A demonstration forest of about 300 acres has been given to the college by George Watts Hill. This area is rugged in topography and includes a wide variety of types. It is located on paved highway No. 13, known as the Roxboro Road, 17 miles north of Durham and 40 miles from the college. The present stand of timber large enough to be used for pulp-wood, poles, posts, and saw timber is estimated by Doctor Hofmann at about 3,000,000 board feet. A camp will be established to house students while they are doing special work on this area.

An arboretum is being developed on an 80-acre tract acquired for the use of the forest school on route 10, adjoining the city limits of Raleigh on the south. This tract is traversed by Walnut Creek and includes some wet areas and upland. Doctor Hofmann finds it admirably suited for an arboretum because it will provide for the large number of swamp trees and shrubs found in the coastal region. At present about 60 species of native and foreign trees have been planted. About 10 to 30 trees of each species are used, planted in mixture and in groups.

The Poole Woods, a virgin loblolly and shortleaf pine area of approximately 75 acres located about 4 miles east of Raleigh, will be available to the school for research purposes.

The forestry field work done thus far by the college has consisted in an intensive cruise of about 50 acres of timberland on the Camp Polk prison farm, and the initiation on this area of experiments in different methods of cutting. A cooperative plan agreed upon some time ago gives the forest school supervision of the management of the whole 1,000 acres of timberland on the prison farm, and makes prison labor available for cutting and milling the timber. Doctor Hofmann foresees that with good management the timber production on this land, now nearly three-quarters of a cord per acre per year, can be increased to at least 1 cord per acre per year. If the whole 1,000-acre tract is put in proper shape, he says, it should meet the prison camp's requirements for timber and for about 500 cords of fuel wood a year and should also provide some material for sale.

Pennsylvania Opens Forest Research Institute

Formal opening of the Pennsylvania Forest Research Institute, at Mont Alto, Franklin County, Pa., took place on June 5. Before a gathering of about 300 Earle H. Clapp, chief of the branch of research, United States Forest Service, outlined the significance of forest research and Joseph S. Illick, State forester of Pennsylvania, traced the development of forest research activities in Pennsylvania and told of the plans of the new institute. In the afternoon about 200 guests joined in a motor tour to the 12½-acre Mont Alto State Forest Nursery and to the Mont Alto and Michaux State Forests, where they inspected improvement cuttings, growth study plots, various experimental and other plantations, and a Scotch pine seed supply station. The guests received as souvenirs copies of Research Bulletin 1 of the Pennsylvania Department of Forests and Waters, entitled "A Guide to Forestry Studies and Demonstrations on the Mont Alto and Michaux State Forests." This illustrated bulletin lists 84 forest study plots and demonstrations, representing work over a period of 30 years. The plots are plainly marked on the ground with numbers so

as to be identified with the descriptions given in the bulletin.

Pennsylvania had a forestry investigative committee as long ago as 1888. The State established its first forest nursery, at Mont Alto, in 1902 and created an office of research in the department of forestry in 1920. During the past decade from two to four technical foresters have been engaged in forest research with headquarters at Harrisburg. The new forest research institute, which is a part of the State department of forests and waters separate both from the forest administrative organization and from the State forest school, has a staff of seven research foresters headed by Willis M. Baker, formerly associate State forester of New Jersey. It is planned to add one research entomologist and several resident fellows, and from time to time to employ temporarily additional research specialists.

The institute has as its purpose the betterment of forest practice on 13,000,000 acres of forest land in the State of Pennsylvania, of which 1,500,000 acres is now owned by the State. The subjects with which it intends to deal include forest fire protection, white pine blister rust control, control of destructive forest insects, improvement of forest types, improvement of cutting methods, seed selection, problems of reforestation, tree growth and yield, wood utilization, and deer damage. It contemplates a survey of Pennsylvania's forest resources.

Although the institute does not plan to give courses of instruction, it will cooperate with universities and colleges in offering opportunity for graduate work leading to advanced degrees. It will endeavor to interest forest land owners in the results of its research through demonstrations, conferences, lectures, radio talks, and the distribution of publications.

Offices, laboratories, and library of the institute are in Science Hall, one of the buildings included in the Mont Alto plant of the Pennsylvania State Forest School.



A recent accession reported by the Pennsylvania State Forest School is the tree and shrub herbarium of the late John W. Harshberger, former professor of botany at the University of Pennsylvania. Doctor Harshberger bequeathed his herbarium to the school.



In order to provide New York tree planters with helpful advice as to choice of species with reference to soil and other local conditions, as to choice of mixture of species, and as to choice of planting methods, the New York State College of Forestry has undertaken a survey of forest plantations in the State. Prof. Svend Heiberg, of the department of silviculture, has charge of the study. He will have two assistants. The State conservation department will cooperate by providing records as to age and growth of plantations.

Press Takes First Rank as Educational Medium for Forestry Bureaus

The press is the most effective single medium of public education in forestry, according to the replies made by State forestry organizations and the United States Forest Service to a questionnaire recently circulated by the Minnesota Forest Service. It stands first in the esteem of at least 10 of the 31 organizations reporting and second in that of 10 others. Personal interviews are the medium highest in favor with 4 State organizations, motion pictures with 3, lectures and talks with 2. Louisiana depends most on Forest Week observance, Delaware on forestry demonstrations, Indiana on its forest nursery, Mississippi on work in the schools, and Minnesota on exhibits.

Forestry has a place in the public-school instruction of 8 of the 29 States reporting on this point and introduction of forestry teaching into the public schools is contemplated by 4 others. Nearly all the organizations reporting offer lectures and talks, five of them employing someone on a full or part time basis specifically for this work. About 8 States reported general distribution of a State forestry periodical. Of 30 organizations reporting as to the use of exhibits 25 make use of exhibits at county and State fairs and elsewhere; 3 of these, together with 1 that has abandoned the practice, expressed doubt as to whether the results obtained through the use of exhibits justify the cost. Motion pictures are used by 8 of the organizations, radio by 3.

Cornell Teaches County Officials How to Plant Trees

A tree-planters' school was held at Cornell University on March 27-28 for the benefit of men in charge of the planting of county forests. Of the 20 New York counties that accepted for this year the State's offer of aid in establishing county forests more than half had not previously undertaken such work, writes Extension Forester J. A. Cope, so that in a number of cases responsibility for directing county reforestation work was delegated to men with no previous experience in that line. Thirteen counties were represented by the 48 men who registered as students in the 2-day school. At morning sessions members of the Cornell forestry faculty discussed considerations governing selection of species, spacing, and the planting of species in mixture. The first afternoon was devoted to a field trip, led by Professor Cope, to the nursery of the agricultural college and to forest plantations in the vicinity of Ithaca ranging in age from 5 to 50 years. On the second afternoon 30 planting supervisors lined up in crews of two with grub hoes and a quantity of 4-year-old northern white pine transplants provided by the State conservation department, and under the direction of Prof. S. N. Spring planted the trees on part of the

Ithaca watershed. Several types of planting tools were tried out, but in the heavy Volusia soils the grub hoe showed the best results. Both the hole and the slit method of planting were tried out. The rope method of keeping rows and spacing uniform was demonstrated and proved its value in open land, particularly on steep hillsides where flags can not be set up at any great distance ahead.

Cornell Continues to Put Forestry on the Air

The forestry faculty of the New York State College of Agriculture remains faithful to the radio audience. The school's radio program, broadcast over radio station WEAI, Cornell University, was continued through the spring months with the following talks:

APRIL

Handling, Planting, and Care of Forest Tree Seedlings-----	J. E. Davis.
School Forests-----	J. A. Cope.
Why Plant Evergreens?-----	F. I. Righter.
Some Reforestation Projects in Europe-----	R. S. Hosmer.

MAY

Protecting Woodlots from Grazing-----	S. N. Spring.
Let Nature Replant Your Trees-----	J. N. Spaeth.
Important Tree Diseases of New York State-----	D. S. Welch.
The Present Status of Chestnut-----	J. Bentley, jr.
The Tourist and the Forest Fires in the West-----	E. Fritz.
The Taxation of Forest Land-----	R. S. Hosmer.

JUNE

Western New York Forestry Tour-----	J. A. Cope.
White Pine Weevil-----	J. A. Cope.



The University of Michigan Foresters' Association plans to establish a student loan fund as a memorial to Filibert Roth, first head of the university's department of forestry.



The California State Automobile Association and the Automobile Club of Southern California contributed prizes totaling \$400 in value for award in a forest-fire prevention essay contest held this spring in the California public schools. These prizes were offered in addition to bronze medals provided by the American Forestry Association. The contest was sponsored by the Stop Forest Fires Committee of California, which represents Federal and State park, forest, and road agencies, county supervisors, and automobile clubs.

Tennessee Farmer Sells Timber Under Contract Planted Black Locusts Grow Tall Among Corn

John W. Cate, of Cleveland, Tenn., has sold the mature oak, hickory, and ash on a 150-acre timber tract under a contract, suggested by Extension Forester G. B. Shivery, providing that the operator shall utilize the marked timber down to the minimum merchantable board and shall pay for the lumber as it is sealed from the saw. Ties, dimension stock, and boards of all grades are to be produced from timber designated by the owner, who had Mr. Shivery's help in selecting the trees to be cut. The prices agreed upon are \$10 per 1,000 board feet for oak and ash and \$5 per 1,000 board feet for hickory. The operator agreed to saw, at a rate not exceeding \$5 per 1,000 board feet, any logs that the owner might deliver to the mill for the purpose of making lumber for constructing or repairing farm buildings. He agreed to protect unmarked timber from injury, and to tolerate no unnecessary chopping of sapling trees in making roadways.

Forestry House Attracts Interest at Indiana State Fair

Among its various means of arousing public interest in forestry the Indiana Department of Conservation gives high rank to the forestry building which it has maintained at the State fair grounds at Indianapolis for the last 15 years. The building is 30 by 40 feet and has a porch with benches. It cost \$957 in 1915. Its interior is finished in panels of white oak. Typical exhibits are planting stock from the State forest nursery, mounted specimens of leaves, twigs, flowers, and seed of Indiana trees and shrubs, pictures of birds accompanied by information as to the place of insects, weed seed, and grain in the birds' diets, and a model of a farm, under a water spray, illustrating the effect of forest cover in preventing erosion. At one fair it was estimated that nearly 10,000 people visited the building. On days of heavy attendance four men are sometimes kept busy answering the visitors' questions.



More than 200 boys and girls in the 4-H forestry clubs of Montgomery County, Tenn., have taken up the black walnut planting project proposed by County Agent G. C. Wright. When the supply of walnuts available for planting gave out during the past season walnut seedlings were used. A number of boys as well as adults in the county are participating in Mr. Wright's project for planting black locusts on poor soils such as those worn out by growing too many successive crops of tobacco. Ten or more demonstration plantings were made this year with 6,750 locust seedlings.

Black locust seedlings planted on the farm of F. V. Peart at Rupert, Idaho, in the spring of 1928 as a combination farm woodland and shelter belt now have an average height of 12 feet and in a few cases are 2 inches in diameter, almost large enough to be used for picket fence posts, Extension Forester A. M. Sowder reports. The spacing was 6 by 6 feet. Twelve hundred trees per acre survived the second growing season. Mr. Peart has cultivated and irrigated the trees with care. In each of the two years following their planting he raised a half crop of corn in the space between the rows and between the trees in the rows. The corn crop supplied an additional motive for cultivation and gave the trees the benefit of side competition for light. Last winter Mr. Peart pruned off the side limbs. He will give the plantation intermittent irrigation and will continue winter pruning. He planned to seed the woodland to white clover and orchard grass this summer in order to obtain a forage cover before the trees shade the ground completely. Turkeys are allowed to run through the plantation and in the future some use is to be made of it for calf pasture. Part of the ground taken up by the plantation is a sandy patch that was difficult to cultivate.

Demonstration Tree Plantings in Iowa

This year's spring forestry activities on Iowa farms started 62 new demonstrations of windbreak planting in 11 counties and included follow-up work on 200 such demonstrations previously established in 32 other counties, Extension Forester I. T. Bode reports. Practically all such planting in Iowa is handled under a plan whereby a county is organized as a whole for the work and one demonstration is established in each township. Six counties have applied for the beginning of a windbreak-planting program in 1931. The trees used this year, numbering nearly 20,000, were furnished from the nursery at the Iowa State College without charge other than the cost of digging, packing, and transporting them. More than two-thirds were conifers.

Between 40 and 50 demonstration tree plantings for erosion control were begun in 19 counties of Iowa this spring under forestry extension service and county-farm bureau supervision. Willow or cottonwood was planted in the wet soil in the bottoms of gullies and black locust was used in the dry clay soil of the banks and tops of gullies. Because it was found difficult to obtain black locust seedlings at the desired price 50 pounds of locust seed were distributed to as many farmers to be planted in garden rows. Seedlings grown from this seed will be dug and planted on eroded areas next year.

New Jersey 4-H Forestry Clubs

As leader of New Jersey's junior 4-H forestry club activities Extension Forester E. L. Scovell has not established any "required courses"; instead, he bases everything on spontaneous development of each child's individual interests. Seeing as the ultimate object of the 4-H forestry club program the establishment of a personal forestry interest on the part of members of the rising generation, he and his local club leaders offer guidance and help to the individual child in following out an interest in trees, in animals, in birds, or in some other nature-study subject. Mr. Scovell describes the club work as follows:

The junior 4-H forestry club work is intended for rural and urban boys and girls aged 9 to 14 years, inclusive. First of all its purpose is to develop an interest in the woods. This it strives to do by showing children that the woods are filled with interesting things worthy of investigation and productive of much clean and healthful pleasure. Its broader purpose includes helping boys and girls to a knowledge of the woods and its inhabitants and of the primary principles of protecting and conserving forest resources.

The whole program is founded on the principle that each child is an individual differing from other boys and girls in interests, character, abilities, and potentialities; that to teach a child to like the forests we must begin with the things in which the child is interested and in some way associate those known interests with the forests. This association may in some cases be made directly and in others may have to be brought about gradually by the skillful guidance of the leader. Once the association with the woods is made there will be a natural expansion of these normal interests. In keeping with this principle we have chosen a very flexible type of program rather than the yearly task type.

Instead of thinking of our boys and girls as tools to demonstrate better practices to adults, we are thinking of them as future men and women whom we desire to feel the value of woodlands and help in woodland conservation and development. We give each child in the clubs individual attention, and use our subject matter and teaching methods only as tools for searching out and developing each child's interests and potentialities.

We include in our program a great variety of projects and subprojects featuring different appeals and adapted to children of different ages. These are presented to each club in a mimeographed booklet, written in simple style and well illustrated, known as the leader's guide. Each member of the junior 4-H forestry clubs is encouraged to look through this booklet. He chooses the project that appeals to him, and that is the project he follows. The booklet is available to him for further reference. The local leader helps him only when requested or when it seems that a timely suggestion will reveal new prospects worthy of investigation. The club member is encouraged to feel that the project he is following is his, and that he is to depend on his own initiative and ability as much as possible.

The clubs meet regularly, some twice a month and some weekly. They conduct their meetings according to parliamentary procedure. Under new business the members voluntarily report on and discuss things they have been doing, have seen, or are planning to do, also plans for club activities.

Mr. Scovell follows a similar plan in introducing forestry activities at summer camps of 4-H Clubs. Children in camp are given the opportunity to choose their subjects of investigation and to make something with their hands, such as bird houses, plaster casts of bird and animal tracks, or leaf prints, which they can carry home as souvenirs.

Since the first two clubs were formed, in December, 1926, membership has grown, without solicitation, to 2,000 at the beginning of 1930. The number of local leaders has increased even faster. County school superintendents and school teachers are giving enthusiastic support. Many helping teachers (assistant county school superintendents) and other public-school teachers are among the volunteer local club leaders who assist the county club agents.

The senior 4-H forestry club project, for boys aged 15 to 21 years, carries on into practical woodland management. Two senior clubs have already been formed.

Pasadena Junior Chamber of Commerce Parades for Forest Conservation and Protection

A big parade in which shovels took the place of swords was the climax of a forest conservation-fire prevention campaign held April 20-26 by the Pasadena (Calif.) Junior Chamber of Commerce. Twenty floats depicted fire-prevention needs and forest uses, and several hundred Boy Scouts and members of the Angeles Forest Protective Association, the latter appearing in fire-fighting costume with shovels and axes, marched to the time of the local American Legion drum corps and the music of four bands. Thirty-five units of fire equipment including tank trucks and equipment trucks had place in the procession, which wound up with a calliope. The parade terminated in the plaza before the city hall, where a forest setting of pines, cedars, brush, and cabin had been prepared, and in this setting a scene representing the escape of a campers' fire and the efforts of fire fighters to save forest and cabin was enacted before a crowd of 2,500 or 3,000. Other features of the week were window displays, forestry motion-picture showings and a forestry and conservation question contest in the schools, and forestry talks before service clubs and Boy Scout troops.



The study of forestry methods has been introduced in 22 negro vocational schools in Mississippi. Seed of black locust, loblolly pine, and shortleaf pine have been distributed to the schools by the State forest service to be planted in seed beds prepared by the students and later to be transplanted to waste lands. Bronze medals provided by the American Forestry Association are to be awarded to the schools obtaining the best results.

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Black Locust Plantation on Idaho Farm Gives Good Returns

From 1½ acres of a 27-year-old black locust plantation on his farm near Wilder, Idaho, Albert Alexanderson obtained a total return of \$1,020, Extension Forester A. M. Sowder reports. Mr. Alexanderson received \$900 for fence posts, which he sold at the following rates:

	Each
Posts 7 to 8 inches in top diameter, 8 feet long.	\$1.00
Posts 5 to 6 inches in top diameter, 6½ feet long.	.25
Posts 2 to 4 inches in top diameter, 6½ feet long.	.10

The fuel wood, which amounted to 10 cords and was used on the farm, was valued at \$120. Mr. Alexanderson's 50 days' labor in felling the trees and cutting them into posts and cordwood was valued at \$150. Thus the net return was \$870, or \$580 per acre—which is \$21.48 per acre for each of the 27 years during which the trees had occupied the land. No records were available to show the value of cuttings made intermittently by previous owners. The timber cut by Mr. Alexanderson was a portion of a 17-acre plantation established in 1901 on blow sand soil with nursery stock purchased at \$6 per 1,000 and spaced 6 by 6 feet. The soil, formerly unfit for agricultural use, has been so enriched by the locusts that it is now believed to be suitable for cultivated field crops.



Sales of white oak poles for harbor piling and hickory poles to be used in ocean fishing have brought returns of \$6,000 in 18 months to farmers of the Landis community, Rowan County, N. C., Extension Forester R. W. Graeber reports. The contractor buying them is paying the farmers from \$2 to \$2.50 apiece on the stump for hickory poles to be used by ocean fishermen for fastening their nets. These poles range in length from 50 to 100 feet. White oak poles for harbor piling, the diameters of which usually range from 14 to 20 inches at the bottom and from 5 to 8 inches at the top, bring from \$2.50 to \$4 apiece.



Prizes for 4-H forestry club work will be awarded at the Utah State Fair this year, for the first time. Awards of \$8, \$6, and \$4 will be made to the clubs exhibiting the best collections of leaves, twigs, woods, poison plants, range plants, and rocks, and the same amounts are offered to the winners of a forestry identification contest.



The Kentucky Forest Service last year opened to the public at the State fair grounds, Louisville, a permanent forestry building, 35 by 55 feet, constructed of logs cut on the State forest. Panels and bromides were used on the walls and moving pictures of forestry subjects were given at scheduled hours.

Farm Forests Started Along Highways of Southern Idaho

Demonstration farm forest plantings were started in the spring of 1930 at 12 points along main highways of southern Idaho, through cooperation of the farmers, Extension Forester A. M. Sowder, and county agricultural agents. These plantings, designed to develop into farm woodlands, shelter belts, and windbreaks, were made with 1 and 2 year old seedlings of black locust, Russian olive, and Siberian elm. Black locust is favored because of its special merit for fence-post production, but in certain sections of the State its use is restricted by climatic conditions. Where it is not practical to plant locust, Russian olive is substituted. Planted together with Siberian elm this tree makes an efficient windbreak. The trees were placed at intervals of 6 feet in rows 6 feet apart, a spacing that permits horse cultivation for the first two years.



Requests for trees for planting on Wyoming farms in the spring of 1930 exhausted the State university's supply of 87,000 trees when the planting season was not much more than half over, writes Extension Forester W. O. Edmondson. The trees distributed were 1 to 3 year old seedlings of blue spruce, western yellow pine, American elm, boxelder, Siberian pea-tree, Chinese elm, western choke cherry, cottonwoods, green ash, Russian olive, silver poplar, and willows. Those ordered in greatest numbers were Siberian pea-tree, western yellow pine, and cottonwoods.



New York's program for Conservation Week, 1930, began with a talk over radio station WGY on April 1 by Governor Roosevelt. Conservation Commissioner Alexander Macdonald and members of his staff were scheduled for radio talks on the remaining days of the week. The Empire State Forest Products Association in collaboration with the New York State Forestry Association prepared a 2-page spread on forest conservation which was distributed to newspapers, fish and game clubs, members of the legislature, and others. The association also prepared and distributed a fire-warning blotter.



In Caldwell County, N. C., 80 4-H club boys planted 2,000 black walnut trees this spring on waste corners of their home farms. Caldwell County did not receive any of the black walnut trees grown in the North Carolina State nursery, the supply of which was exhausted early in the season, but a citizen of Caldwell volunteered to pay for 2,000 trees from the Alabama State nursery on condition that the club boys agree to plant them and to keep records of their growth for five years.

Forest Service Notes

National Forest Reservation Commission Authorizes Purchase of 422,737 Acres and Approves New Purchase Units

Purchase by the Federal Government of 422,737 acres of land for national-forest purposes at a total cost of \$1,201,262 was approved by the National Forest Reservation Commission at a meeting held May 17. This purchase program, one of the largest approved by the commission in recent years, involves lands within 27 different purchase units in 15 States. It provides for the acquisition of 539 tracts at an average cost of \$2.84 per acre.

Initial purchases of 58,522 acres and 42,774 acres, respectively, in the Flambeau and Oneida purchase units, in Wisconsin, are included, together with 66,527 acres of land elsewhere in the Lake States. Other large items in the program are 40,120 acres in the Choctawhatchee unit, 29,435 acres in the Osceola unit, and 14,241 acres in the Ocala unit, all in Florida; 33,447 acres in the Nantahala unit, in Georgia, North Carolina, and South Carolina; 30,070 acres in the Ouachita unit, in Arkansas; 26,057 acres in the Cherokee unit, in Tennessee, Georgia, and North Carolina; 16,955 acres in the Monongahela unit, in West Virginia; and 15,944 acres in the Catahoula unit, in Louisiana.

At the same meeting the commission approved the establishment of four new national-forest purchase units, the location and gross areas of which are as follows: The Cumberland unit, 580,000 acres, in eastern Kentucky; the Kiamichi unit, 345,200 acres, in Le Flore and Latimer Counties, Okla., and Polk County, Ark.; the Homochitto unit, 325,000 acres, in southwestern Mississippi; and the Evangeline unit, 75,000 acres, in Rapides Parish, La. No national-forest purchase unit had previously been approved in either Kentucky, Oklahoma, or Mississippi.

Congress Authorizes Appropriations for Purchasing National Forest Land and for Reforesting National Forest Land

An act of Congress approved June 2, 1930, authorizes appropriation of \$3,000,000 in each of the fiscal years 1932 and 1933 for purchase of lands for watershed protection and timber production under the Weeks Act as amended by the Clarke-McNary Act. An act approved June 9, 1930, authorizes appropriation of \$250,000 for the fiscal year 1932, \$300,000 for the fiscal year 1933, and \$400,000 for each fiscal year

thereafter, for reforesting national forest land by planting or seeding. These figures represent increases over the appropriation for these purposes during the fiscal year ending June 30, 1931, of \$25,000, \$75,000, and \$175,000, respectively. This act also gives the Secretary of Agriculture authority to require any purchaser of national forest timber to deposit, in addition to the payment for the timber, money to cover the cost to the United States of planting or seeding the land cut over by the purchaser or the cost of destroying or removing undesirable growth remaining on the cut-over land with the purpose of improving the future stand of timber.

Additional Appropriations for National Forest Road Building Authorized by Congress

A bill signed by the President on May 5 added \$5,000,000 to the amount, \$7,500,000, previously authorized for appropriation for national forest road construction in the fiscal year 1931, and made the same increase in the amount authorized to be appropriated for such use in each of the fiscal years 1932 and 1933. Permission to obligate the additional \$5,000,000 during the fiscal year 1931 is embodied in the second deficiency bill. An additional appropriation of \$3,500,000 for national forest road construction within the fiscal year 1931 is likewise carried by this bill.

The additional \$5,000,000 authorized to be appropriated for each of the three years would preferably be used in the construction of forest highways that are projected as parts of the Federal-aid system. This money would be prorated among the States containing national forests in the same way that like appropriations have hitherto been apportioned; that is, in accordance with the ratio that the area of the national forests in each State bears to the total area of all the national forests and in accordance with the ratio that the value of the national forest resources in each State bears to the total value of the resources of all the national forests, each of the two considerations having equal weight.



National forest receipts for the 9-month period ending with March, 1930, were \$4,406,981, or \$505,052 more than those for the corresponding period of the previous fiscal year. Receipts from timber sales accounted for \$397,835 of the increase, and livestock grazing fees showed a gain of \$99,487.

Scattered Seed Trees Fare Badly on Cut-over Douglas Fir Lands

Too many of the seed trees left by loggers on Douglas-fir lands of the Northwest are dying before they perform their mission, reports Leo A. Isaac, assistant silviculturist of the Pacific Northwest Forest Experiment Station. Mr. Isaac's data, obtained through cooperation of forest officers on the Snoqualmie, Mount Baker, Cascade, Santiam, and Mount Hood National Forests, cover seven representative areas of from 30 to 70 acres each on these forests. Losses of seed trees on these areas at the time of logging and within periods of from 1 to 5 years after logging ranged from 9 to 78 per cent and in only two instances were less than 31 per cent.

The current logging practice on Douglas-fir areas of national forests in the Northwest is a clear-cutting system that usually leaves not more than 5 per cent of the merchantable volume of the stand. The original Douglas-fir forests were largely mature, even-aged, and very dense stands that did not invite any system of partial cutting. Because the mature Douglas fir is highly resistant to fire damage and is a prolific seeder, and because seed dissemination tests in the region have demonstrated that a distance of from 500 to 1,000 feet between seed trees does not prevent satisfactory reseeding if the seed supply is adequate, the Forest Service has customarily required only that one or two trees to the acre, evenly distributed over the area, be left by the loggers as seed trees. This requirement has been met largely by leaving defective trees which, though worthless for lumber, were capable of producing good seed.

The losses recorded on the seven areas studied were caused by all phases of the logging operation and by windfall. Loss in connection with the falling operation was found to be very low on all areas studied except one, where it amounted to 22 per cent. The heaviest recorded loss from the skidding operation was 12 per cent. It was common, however, for a seed tree to be injured at the base in skidding. When the slash fire occurs the pitch face resulting from such an injury burns so severely that the tree may be killed. With the pitch faces contributing to the severity of the burn, the slash fire usually takes a heavier toll of seed trees than either the falling or the skidding operation. On one sample area 20 per cent of the seed trees were killed outright by the slash fire and the remaining 80 per cent were all listed as injured; during the three years that followed an additional 34 per cent died, apparently from fire injury.

The greatest loss attributed to a single cause was that due to windfall. On one sample area 29 per cent of the seed trees were wind thrown. Some windfall occurs on practically all areas; but loss from this cause is heaviest on the better sites, because there the soil is more moist, the trees are larger, and the removal

of the surrounding timber causes a greater loss of protection.

Suggestions made by forest officers and others for giving the average Douglas fir seed tree a better chance to survive include the following: Locate spar trees in advance if possible and mark no seed trees within 400 feet of them. Also avoid leaving trees close to "high lines." Watch falling and skidding crews and do not permit unnecessary damage. Make an effort to leave seed trees on ridges and exposed places where trees are naturally shorter and more wind firm and where they are less subject to injury from falling, skidding, or slash fire. Do less slash burning, and control it more carefully. When feasible omit slash burning on small areas of low fire hazard, such as steep slopes where most of the débris is dragged into the canyon.

A better way of providing for reforestation of cut-over Douglas fir areas will perhaps be found in the "spoke," "strip," or "group" system of leaving seed trees, tests of which have recently been started on various national forests. In general this contemplates leaving the same number of trees as are left under the scattered seed tree system (not more than 5 per cent of the merchantable timber by volume) but permits concentrating them around the edges of settings, on ridges, or at other points where they are less subject to injury from wind, logging, and the slash fire and are more advantageously situated for seed dissemination. The chief objection to this system is that it necessitates leaving greater numbers of sound trees. Mr. Isaac suggests that it might be well to enlarge the groups to a size that would justify coming back at a later date to log them. Blocks of timber so left, besides providing a source of seed for the cut-over area, would greatly reduce the general fire hazard.

Southwestern Forest and Range Experiment Station Created

The Secretary of Agriculture has approved the establishment of the Southwestern Forest and Range Experiment Station with headquarters at the University of Arizona, Tucson, Ariz. This order centralizes the direction of Forest Service research in silviculture and range management in the Southwestern States. G. A. Pearson, who has had charge of the Southwestern Forest Experiment Station, Flagstaff, Ariz., will direct the new station and will be immediately in charge of its silvicultural work. C. K. Cooperrider, heretofore in charge of research in range management and erosion control on the national forests of the Southwest, in his new status as a member of the experiment-station staff will have charge also of the work at the Santa Rita and Jornada Range Reserves. These reserves and the station at Flagstaff will be maintained as branch stations.

Tank Trucks for Fire Suppression on the Angeles National Forest

By W. T. MURPHY, United States Forest Service

With all the time and effort that are being put into the study of forest fire suppression tactics, we can not get away from the primary importance of water as a means of extinguishing fire. In southern California, where water supplies are probably as limited as in any other forest area in the United States, special effort has been made to speed up the development of tank trucks and pumps and of sources of water supply. One of the most notable advances made on the Angeles National Forest in provision for suppressing fires has been the introduction of combination pump and tank trucks.

The start was made by lining up for fire duty as many road sprinkler tank trucks and orchard heater distillate tank trucks as it was possible to get. Provision was made for mounting portable gasoline-operated fire pumps on some of the tanks. Owing to the length of time required to get them mobilized, these tanks could be used only on large fires that had been going for some time. We soon discovered that in order to have water available at the start of a fire and at the time when it would do the most good we should have to acquire our own tank trucks and keep them in constant readiness for use.

Our first tank truck was placed in commission during the summer of 1928, and has been in regular service ever since. This truck is a 2½ ton model carrying an 850-gallon-capacity water tank equipped with a secondary transmission. An Edwards rotary gear pump driven from the truck motor by means of a power take-off and a chain drive serves as the primary pump unit. This pump has a capacity of about 100 gallons per minute and delivers pressure of about 150 pounds for ordinary working conditions. The equipment on the truck consists of 900 feet of 1½-inch rubber-lined cotton-jacket hose, a Ross portable pump, and a monitor nozzle mounted on the tank itself for service along the roadside. An added feature is that the tank and hose drawers can be detached and ordinary stake sides placed on the truck, making it a general utility truck for winter service. This first truck has a number of serious disadvantages. It is too heavy to make good speed on the highway, because we are trying to carry too much water in it and because the convertible feature makes it necessary to carry a heavy flat platform under the tank; also the pump, being on the outside of the truck frame, is apt to be torn off in the event of an accident. In constructing our next truck we endeavored to eliminate these disadvantages as far as possible.

The second Angeles tank truck, placed in commission in October, 1929, is considerably smaller than the first. It carries only 450 gallons of water, but is equipped with

10 back-pack pumps of 5-gallon capacity each, 8 shovels, 6 axes, a telephone, a first-aid kit, and 2 Coleman lanterns, none of which are carried on the first truck. Other equipment carried includes a reel with 300 feet of 1-inch noncollapsible hose, 400 feet of 1-inch collapsible hose, and 600 feet of 1½-inch rubber-lined hose, and a Ross portable pumper. On this truck, also, the pump unit is an Edwards pump, the only difference being that the pump is mounted under the truck seat instead of on the outside of the truck frame. This later truck develops 56 horsepower and when loaded weighs about 15,000 pounds. It is equipped with a secondary transmission.

The first Angeles Forest tank truck has paid for itself several times over. In 1929 alone it saved \$6,500 worth of improvements and in three instances prevented the development of what threatened to be a very serious brush fire, as well as cutting down the cost of suppression on four other fires. On one fire only one-half acre in size a mopping-up job for which four man-days would ordinarily have been required was performed in three hours by means of the tank truck. On the one fire on which the second tank truck has been used it gave a very good account of itself by reducing the mopping-up and patrol costs as well as insuring complete extinction of the fire during a period of very low humidity.

Nine tank trucks are now being operated in Los Angeles County—2 by the United States Forest Service, 6 by the Los Angeles County Forestry Department, and 1 by the Los Angeles County Park Department. The present summer will probably see this number raised at least to 13.

The tanks have proved most effective in reducing the time required for patrol and mopping up and in controlling incipient fires. The use of the tanks appears to lighten considerably, also, the task of controlling back-fires set along roads. We expect that as we acquire more of these tank trucks we shall become more proficient in their use and the importance of their place in our fire-suppression work will constantly increase. Experience gained in the use of the trucks will probably enable us to make each truck we develop an improvement over its predecessors; next time we plan to substitute a 2-stage centrifugal pump for the rotary gear pump, to use a truck with 70 to 80 horsepower rather than one with 56 horsepower, and to use a light double-jacket hose capable of standing up under pressure as high as 400 pounds.



The Secretary of Agriculture has approved the substitution of the words "region" and "regional" for the word "district" as applying to the nine areas into which the United States is divided under the national forest administrative plan and to the titles of field officers of the Forest Service. The change became effective May 15.

Horse and Trail Grader for Fire-Line Construction

W. J. Brokenshire, forest ranger on the Lassen National Forest, Calif., tells how the horse and trail grader rendered effective service last year when he was called to fight a fire on State-patrolled land on Davis Mountain. The fire occurred in fairly open western yellow pine and Douglas fir type, at an elevation of 3,200 feet. The ground cover was of litter, squaw carpet, and brush, with some reproduction. The fire had covered about 800 acres when the ranger and three other men arrived with tools, horse, trail grader, and kerosene torch. The use of the trail grader enabled the small crew to make a fire line without the delay that would have been involved in getting together a larger crew. This saving of time enabled the crew to back-fire with the Hauck torch when conditions were favorable. Two men with horse and trail grader constructed 4 miles of fire line, making two trips over the line, at a rate averaging about 1 mile per hour. Part of the line had to be fired as soon as it was plowed; the remainder was fired at night. While one man back-fired with the torch another cleared out the trail in places which the trail grader had missed and two men patrolled the line, one on horseback and one on foot.

The cost of this line, aside from the back-firing, was \$1.39 per mile; according to experiments carried out at a California forest ranger school, if constructed with shovels, McLeods, and rakes in similar country it would have cost \$11.50 per mile. There was an additional saving in cost of supplies and transportation.

The fire was controlled when it had burned approximately 1,000 acres.

Poison Proves Effective Against Pine-Destroying Ants

Ants identified as *Cremastogaster lineolata* var. and *Tapinoma* sp. which have given trouble in nursery beds and seed-spot plantings on the Choctawhatchee National Forest, Fla., by cutting off and carrying away the cotyledons of newly germinated pine seedlings, have been successfully poisoned with preparations supplied by the Bureau of Entomology. To make these preparations 2 pounds of sugar and 8 ounces of honey are dissolved in a quart of boiling water and either 60 grains of thallium sulphate or 125 grains of sodium arsenate is dissolved in the syrup while it is still hot. The thallium sulphate preparation was found the more effective. Bran soaked with the poison is placed at intervals among nursery beds or among seed spots in the field. The poison appears to be effective for a period of 10 or more days after each application.

These ants have very little preference among the various species of southern pine, according to observations of Assistant Silviculturist Eugene W. Gemmer, but appear to cause more damage to longleaf than to

some other species. The recovery of pines attacked by them depends to a considerable degree on the pines' stage of development at the time of attack. If the radicle has made a firm contact with the soil, the chances of survival are good. The stem remains green and after two or three weeks' delay primary needles burst through the wound tissue at the top of the stem. From that stage on, development is normal. The injured seedlings may not, however, succeed in catching up with those that have escaped injury.

The stems of seedlings are seldom attacked by the ants, even if they are growing immediately adjacent to the nest; but if the nest is a large one it may bury seedlings and in this way cause their death.

Portable Radio Sets Undergoing Test on Columbia Forest

Nine portable radio sets weighing, with batteries, about 50 pounds each, are being tried out this summer on the Columbia National Forest, Wash., as a means of keeping trail-construction camps in communication with forest headquarters. Back of this experiment is nearly three years' study by D. L. Beatty, of the Missoula, Mont., office of the Forest Service, of the possibilities of radio as a means of forest protection. Because trail-construction crews move camp frequently they are often beyond the reach of telephones when needed for emergency duty on the fire line. These portable radio sets, light enough to be packed on a horse, promise important service in making trail-construction crews and other detached units readily available when trained fire fighters are needed.



In the northern national forest region, which centers in Montana, plow units are to be purchased with \$20,000 of the \$54,000 increase in appropriations for personnel and fire equipment allotted to the region for the fiscal year 1931. A plow unit includes plow, horse, harness, packsaddle, and a truck to transport horse and plow as close as possible to the point where the fire line is to be made. On any area where rockiness or hilliness does not preclude the use of this equipment, national forest officers have found, 2 men with a plow unit can match from 10 to 50 men with hand tools in fire-line constructing efficiency.



Smoking is restricted this summer on the national forests of Washington and Oregon. Regional Forester C. J. Buck has ordered that "except on paved or surfaced highways, smoking on lands of the United States within the national forests of Oregon and Washington is prohibited while traveling in timber, brush, or grass areas from July 1 until the close of the fire season as declared by the regional forester, but not later than September 30."

A Device for Rationing Water to Nursery Stock

A method of determining how much water must be applied to nursery beds to counteract evaporation is described by Junior Forester C. W. Corson, who has employed it with success at the Susanville nursery, Lassen National Forest, Calif. Mr. Corson used two tin cans, so constructed that one fit inside the other. The outer can was 5 inches in diameter and 14 inches deep; the inner can was 4 inches in diameter and 12 inches deep, had perforations in the bottom, and had a rim around the top which held it clear of the outer can and prevented water from entering the latter otherwise than through these perforations. The outer can was set in the ground at the nursery, its top flush with the surface. The inner can was filled to its top with soil taken from the hole. The quantity of water applied to the soil in the can at a given watering was determined by weighing the soil-filled can before and after the watering. The quantity of water that evaporated from the soil in a day was determined by comparing the weight of the canful of soil after one day's watering with its weight before the watering of the next day, allowance being made for any water that seeped from the inner to the outer can.

Seedlings grew very well in beds to which Mr. Corson applied daily a little more water than was shown by this test to evaporate from them.



Recent tests of a shipment of second-growth Douglas fir at the Forest Products Laboratory disclosed that the specific gravity of the wood was lower than that of virgin-growth Douglas fir from the same region contained in a similar shipment. The difference amounted to about 13 per cent of the specific gravity of the second-growth wood. In both large and small second-growth trees the specific gravity varied considerably from center to circumference; the heaviest wood was found in the last 20 years' growth on the smaller trees. In rings formed during this period the proportion of summer wood was greater than in rings formed during the earlier years of the second-growth trees.



Applicants for admission to the next forest ranger examination given by the United States Civil Service Commission will be required to show that they have had at least three years' experience in forestry work such as lumbering, range management, surveying, and forest fire control. At least six months of this experience must have been in a foreman's position or a similar position involving the direction and control of three or more men. College work in forestry or range management will be accepted in lieu of experience, other than foremanship, up to a total of 27 months. The next forest ranger examination will be held in the fall of 1930.

Timber on the Chippewa National Forest, Minn., that was previously considered unmerchantable is being used by a mill newly established at Cass Lake, Minn., as material for railroad-tie plugs. These plugs are made to be driven into holes left by the removal of spikes from railroad ties when the ties are changed from their original positions. They prevent the entrance of water and tend to reduce the rate of decay. Several million such plugs are used annually on railroads in the Lake States. The mill at Cass Lake makes the plugs from American elm, sugar maple, and balm-of-Gilead poplar and from the tops of better hard-wood species. The mill has a capacity of 1 carload of plugs a week, employs 8 men, and uses about 25 cords of wood a week.



Federal forest planting in Wisconsin began in May, 1930, with the planting of 2-0 Norway pine on 510 acres of the Moquah unit, within a month after title to the land had passed to the United States. On 150 acres the trees were planted in furrows; on the remaining area, which was burned over last fall, they were spot planted. All but 80 acres of this planting project is bounded by county trunk highway C.



Examinations of 435 sprouts 2.5 inches or less in breast-height diameter chosen at random on portions of the Bear Pen timber sale area, Ozark National Forest, Ark., showed that 29 per cent of the sprouts were affected by stem rot, the Central States Forest Experiment Station reports. Of the white oak and black oak sprouts examined more than 33 per cent were so affected. As a result of repeated fires the forest reproduction on this forest is practically all sprout growth. Many of the sprouts now present are growing from rootstocks a great deal older than themselves, several preceding generations of sprouts from the same rootstocks having been destroyed in turn by fire.



Forest plantations established in the spring of 1929 on the Kaniksu National Forest, Wash.-Idaho, and the St. Joe National Forest, Idaho, came through a first year of unusual droughts with a percentage of survival that is excellent for that region. At the Priest River Experiment Station, 15 to 30 miles from the Kaniksu projects, the total precipitation during July, August, and September was 0.72 of an inch, 3.30 inches below normal, and at Wallace, Idaho, 10 miles from the St. Joe project, the precipitation for these three months was 1.02 inches, 3.50 inches below normal; yet at the end of the season the plantings, which were of western yellow pine, western white pine, western red cedar, and Douglas fir, showed an average survival of 74 per cent.

Secretary Hyde Willing to Agree to Construction of Cableway on Mount Hood

Secretary of Agriculture Hyde has announced that he is willing to authorize construction of a tramroad and cableway on Mount Hood, Oreg., under certain conditions safeguarding the beauty of the site. (The Mount Hood area is included within the Mount Hood National Forest and is almost entirely Government-owned.) He would require that the construction detract as little as possible from the enjoyment of visitors reaching the area by other means, and would require surety that if the project became so objectionable as to call for discontinuance the site would be satisfactorily restored to its former condition.

Preparatory to deciding on the question as to construction of a cableway and on other proposed developments on the Mount Hood area Secretary Hyde requested the advice of a committee composed of John C. Merriam, president of the Carnegie Institution of Washington, D. C., Frederick Law Olmsted, landscape architect, and Frank A. Waugh, professor of landscape engineering at the Massachusetts Agricultural College. These men made a study of the Mount Hood region in the summer of 1929. They found greater charm in the timber-line region of the area, with its spurs and slopes, diversification of tree growth, and mountain meadows, than in the less accessible peak and the views obtainable from the peak. Moreover they formed the opinion that the attractiveness of the timber-line region would be greatly diminished by the construction of a cableway. For these reasons two members of the committee do not approve the construction of the cableway. In deciding with the minority of his committee Secretary Hyde cites the fact that the proposed tramroad and cableway can be financed immediately by private capital, whereas development of the timber-line region with roads, trails, camp grounds, and shelters could be carried out only at public expense and is not yet provided for by Congress. He states, also, that the majority of the people of Oregon are in favor of the project.

Forest Products Laboratory Identifies Ancient Wood

A piece of a 7-foot tree buried 150 feet below the bed of the Yakima River and estimated to be 12,000,000 years old was recently identified at the United States Forest Products Laboratory as a species of *Sequoia*. The wood specimen, taken from a log encountered in a United States Reclamation Service tunnel being driven under the Yakima River between Ellensburg and Cle Elum, Wash., was sent to Arthur Koehler, wood identification expert of the Forest Products Laboratory, by John P. Thomson, of Ellensburg. According to Mr. Thomson the tree was found in solid basalt believed to

have been poured out of one of the Columbia Plateau volcanoes 12,000,000 years ago.

"The wood is too friable to be sliced thin for microscopic examination, but examination of the whole piece with a hand lens leaves no doubt of its close kinship with *Sequoia sempervirens*, the redwood of to-day," reports Mr. Koehler, who adds:

The redwoods have not always been confined to a narrow strip in California but thrived at one time throughout what is now the United States, Canada, Alaska, Greenland, Europe, and Northern Asia. Fossil sequoia cones were found in rocks and swamp deposits in Europe in the nineteenth century before the only living representatives of the species were known to the white man.



When transplant stock in the Wind River Nursery, Columbia National Forest, Wash., was dug for shipment in 1929 it was found that 91 per cent of the Douglas fir and 96.4 per cent of the western yellow pine originally transplanted were living and in condition suitable for shipment. The Douglas fir, western yellow pine, and noble fir planting stock shipped from the nursery in 1929 was produced at an average cost, for all classes, of \$6.82 per 1,000. For 2-0 Douglas fir the cost was \$3.76 per 1,000; for all classes of Douglas fir the average cost per 1,000 was \$6.72. The nursery's output for the year totaled 1,273,766 trees, of which 84 per cent were Douglas fir, 11 per cent were western yellow pine, 4 per cent were noble fir, and the remainder (less than 1 per cent) were of miscellaneous species.



Sunset Crater, an extinct volcano on the Coconino National Forest, Ariz., has been made a national monument. A presidential proclamation of May 26, 1930, sets aside an area of 3,040 acres including the crater and neighboring volcanic formations. The crater is 16 miles from Flagstaff, Ariz.



Deer have decreased by 2.8 per cent on the national forests of Montana and northern Idaho in the past five years, according to estimates of forest officers. Of the kill of deer in that period 41.5 per cent has been taken by hunters, the remainder being due to predatory animals and other causes. Elk are estimated to have increased 60.3 per cent, moose 39 per cent, black bear 5.1 per cent, grizzly bears 13.6 per cent, mountain sheep 15.6 per cent, and mountain goats 53.5 per cent. For all fur-bearing animals an increase was indicated; otter showed the highest gain, 43.3 per cent. Game birds decreased markedly.



Motor parties wishing to camp on national forests of region 1 will hereafter be granted camp-fire or special-entry permits only on condition that each party carry with it ax, shovel, and folding pail.

General Forest News

Clearwater Timber Co. Practices Selective Cutting

The Clearwater Timber Co., of Lewistown, Idaho, expects to cut about 110,000,000 board feet of timber from its 225,000 acres of timberland in each of the next 25 or 30 years; then, after a wait of 5 or 10 years, it expects to begin cutting from the same land another timber crop as heavy as the present one. The operation began in 1927. The timber is 55 per cent western white pine. The company has 1,000 men at work in the woods and employs 900 men in its mill, which produces 150,000,000 board feet of lumber a year. In the interval between the completion of the present cut and the beginning of the next the company hopes to keep its plant and force busy through the purchase of timber on some of the 700,000 or 1,000,000 acres of timberland other than its own that can be reached through the Clearwater drainage.

On second-growth areas the company is cutting to a diameter limit averaging 17 inches, removing only 60 or 65 per cent of the total volume of standing timber. On some old-growth areas it is cutting in such a way as to save reproduction; for the most part, however, it is clear cutting its old-growth timber, logging with power and burning the undergrowth so as to clear the way for natural reforestation. E. C. Rettig, the company's chief forester, explains the latter practice on the basis that the big logs and steep grades make horse skidding impractical and that the reproduction under the old stands is so defective as not to promise good development even when released from suppression.

Some of the second-growth timber which occupies about three-fourths of the company's acreage is 120 years old. The old-growth timber, all of which is at higher altitudes, ranges from 200 to 400 years of age.

Most of the areas that are being logged are at elevations of from 1,200 to 4,500 feet.

Trees to be cut are blazed once at breast height, so that the sawyers can see the mark even if deep snow is on the ground, and once below the stump line to permit a check on the cutting. In the experimental stage this marking cost not more than 5 cents per 1,000 feet, and it was expected that the cost would later be reduced to 3 cents per 1,000 feet.

At present all slash is being burned; but other slash-disposal methods, including partial burning followed by fire patrol, are being tested.

In cooperation with other members of the Clearwater Timber Protective Association and with the Bu-

reau of Plant Industry the company is eradicating Ribes as a protection from white pine blister rust.

The chief executive of the Clearwater Timber Co. is J. P. Weyerhaeuser, jr. The assistant general manager is C. L. Billings, formerly in charge of the office of forest products in the Missoula, Mont., district office of the United States Forest Service.

Parasite Rapidly Reduces Tip Moth Work in Halsey Plantations

Tip-moth infestation of western yellow pines in the Halsey plantations, Nebraska National Forest, has strikingly decreased since the introduction in 1925 of the parasite Campoplex. In the fall of 1929 L. G. Baumhofer, entomologist in charge of this work, found that in the center of the plantation where the parasite was first liberated in 1925 approximately 82 per cent of the tip moths were parasitized, 80 per cent of them by Campoplex. From this central point parasitism gradually decreased until at the edge of the plantation, 4 or 5 miles away, it was approximately 35 per cent. In the central portions of the plantation the number of infested tips, particularly of infested terminals, has decreased enormously; Mr. Baumhofer estimates that the proportion of infested terminals dropped from 90 per cent in 1925 to 33 per cent in 1929. Here the appearance of the trees has changed markedly in the past two years. Already many trees are assuming normal erect form instead of the characteristic bushy shape which they had taken on as a result of heavy tip-moth infestation. Many of the present leaders on these trees of retarded development are exceptionally sturdy and unusually long for a region of only 16 inches average annual rainfall.

Two or three years more should show conclusively whether or not the parasite can be entirely relied on for control of the tip moth in these plantations.



The Carlsbad National Monument, N. Mex., has become the Carlsbad Caverns National Park, under an act of Congress approved May 14. The act provides that the President may by proclamation add to the park as much as 193 square miles of surrounding public domain lands. The surface boundaries of the national monument took in but 719 acres, although the caves extend for many miles underground. The Department of the Interior will make a study to determine how much land should be added to the park to provide adequate surface protection for the caves.

Silver Nitrate as a Seed Disinfectant

By HENRY I. BALDWIN, Brown Co., Berlin, N. H.

Following up seed-disinfection experiments described in the March, 1929, number of the FOREST WORKER, in which northern white pine seed dusted with Bayer's Dipdust showed increased germination, I have made a preliminary trial of silver nitrate as a preventive of mold development on seed of the red spruce (*Picea rubra*). Experiments in which silver nitrate was found effective in keeping wheat seed free from fungi and bacteria during germination have been recorded by several workers.¹

My tests were made on individual Jacobsen germinators arranged as follows: A knitted cotton pad, with wick attached, was supported over the top of a large-mouthed liter bottle by means of a perforated glass disk. The seed were placed on a filter paper resting on the pad, and covered by a special germinator bell jar having a perforation at the top. To prevent the glass parts from slipping on one another desiccator grease was used. There was thus no metal in the apparatus, and the glassware could be rendered chemically clean. The seed, in small cloth bags, were merely soaked in the solutions for 15 minutes and placed in the germinators without rinsing. Neither filter papers nor wicks were changed during the experiment. In each treatment 200 seed were used.

While too meager to permit of definite conclusions, the data obtained seem to indicate that silver nitrate holds considerable promise as a disinfectant for use in testing tree seed. After 40 days no mold had appeared on the samples treated with N/1,000 AgNO₃, whereas samples soaked in water or in weaker solutions of silver nitrate were badly infected. Seed soaked in distilled water were very badly infected with mold from the twentieth day and after 40 days were completely covered with mold; seed soaked in N/100,000 AgNO₃ were completely covered with mold from the fifteenth day; and seed soaked in N/10,000 AgNO₃ were slightly molded after 15 days and very badly molded after 40 days. Up to 20 days, results indicated that silver nitrate had a retarding effect on germination; at the end of that period the average percentage of germination was 71.5 for seed soaked in water and 66.5 for seed treated with N/1,000 AgNO₃. At the end of 30 days the average germination percentage of the control lot of seed was 77.5 and that of the lot treated with N/1,000 AgNO₃ was precisely the same. For these two lots the average percentages of full seed germinating were 81.5 and 83, respectively.

¹ Groves, J. F.: Temperature and Life Duration in Seeds. Bot. Gaz. 63: 160-189, 1917.

Schröder, H.: Die Widerstandsfähigkeit des Weizen- und Gerstenkernes gegen Gifte und ihre Bedeutung für die Sterilisation, 2 Abt. Centralbl. f. Bak. 28: 492-505, 1910.

— Über die selektiv permeable Hülle des Weizenkernes. Flora 102: 186-208, 1911.

While AgNO₃ is a fairly expensive salt, the quantity required to make up dilute solutions for treating small lots of seed is almost negligible.

Tests are in progress with other substances that may prove helpful in eliminating from experimental seed testing the very disconcerting irregularities caused by mold infection.

Entomologists Seek Pine Beetle Control Method That Will Spare Predators

In preliminary experiments carried out in 1928 and 1929 on the Modoc National Forest, Calif., Federal entomologists have sought to develop a method of western pine beetle control that will spare the clerids, principal insect enemies of the western pine beetle. At present, efforts to control the western pine beetle usually take the form of burning the infested trees or peeling the bark from them and sun curing it. The burning method and, to a less degree, the bark peeling and sun curing method both have the undesirable effect of destroying the predators. A second purpose of the experiments was to devise a control method that, unlike burning, could safely be used in summer.

The method tried was designed to take advantage of the fact that the clerids are motile, while western pine beetle larvæ have practically no power of locomotion. It consists in cutting infested trees and exposing the unpeeled logs to sunlight.

It was found that in the unpeeled bark of logs exposed to direct sunlight on moderately level sites or on southerly slopes temperatures fatal to advanced broods of the western pine beetle are reached when the air temperature goes above 90° F. Bark temperatures ran as much as 32° F. above air temperatures. The difference between bark temperature and air temperature was found to be much greater in the case of an infested log that had lost a considerable part of its moisture than in a fresh green log. No evidence of mortality among the clerids was found even where the bark temperatures were highest. Living clerid larvæ were found in bark in which all the western pine beetle larvæ were killed. The mortality of western pine beetle larvæ in the lower portions of the exposed logs was usually greater than that in standing infested trees, probably because of less favorable temperature and moisture conditions and because of the concentration of clerids driven from the upper portions of the logs by unfavorable temperatures.

This method of control, which will be the subject of further experimentation, is applicable only to trees harboring the summer generation of pine beetle larvæ. Its application is limited, also, to fairly open stands on moderately level sites or southerly slopes where the bark temperature of the upper portions of exposed infested logs will reach well over 100° F. Such conditions are found over large western yellow pine areas in southern Oregon and northern California.

Senate Committee to Study Wild Life Problems

A special committee of the United States Senate has been appointed to investigate matters pertaining to the conservation and replacement of wild life. The committee has been instructed to report as soon as possible, and not later than the beginning of the first regular session of the next Congress, its findings from a study of this subject and its recommendations as to any changes or additions which may in its judgment be required by the existing laws pertaining to wild-life conservation in this country. Senator Walcott is chairman and Senator Hawes vice chairman. The other members of the committee are Senators Pittman, McNary, and Norbeck. The committee has chosen as its secretary Morris Legendre, a Princeton graduate who was a Rhodes scholar and who has had wide experience in studies of wild life.

Water Users Conference Urges Measures for Watershed Protection

The First National Water Users' Conference, held at Reno, Nev., February 26-28, 1930, under the sponsorship of the American Farm Bureau Federation, adopted the following as one of its resolutions:

Whereas overgrazing, fire, destructive logging, rodents, and other factors have already caused material depletion of plant cover to an extent that there is sudden run-off and erosion on watersheds and already storage reservoirs and streams used for irrigation are being filled with silt at an alarming rate; and

Whereas much of this depletion of plant cover and erosion is due to the uncontrolled use of the open public domain; and

Whereas extensive study is needed to fully understand the causes of erosion, develop methods of controlling erosion, and determine the relationship of plant cover and its use to water conservation, which study the several States are unable to make individually without excessive cost and inefficient duplication: Now, therefore, be it

Resolved, By the representatives of the water users of the 11 Western States assembled in meeting under the auspices of the American Farm Bureau Federation, at Reno, Nev., February 28, 1930, that we recommend and urge a nation-wide policy in the handling of the public domain that will primarily and completely protect against erosion and conserve the watersheds of the irrigation farmer of the West; and be it further

Resolved, That we urge and recommend a full study by the Federal Government of the amount and rate of silting of all irrigation streams and reservoirs in the West; and be it further

Resolved, That we urge and recommend the carrying out in full of the research work in forest protection and management and range management on watershed lands as authorized by the McSweeney-McNary Research Act approved May, 1928, and be it further

Resolved, That we urge sufficient appropriation for investigating the causes of erosion, methods of preventing and controlling erosion, and the extent to which

forest, chaparral, and other vegetative cover on mountains or other nonarable lands influences the conservation of the water supply and the regularity of stream flow and prevents erosion, in order to conserve water for irrigation and to aid agriculture.

Vegetational History of Dismal Swamp Traced Through Analysis of Pollen Preserved in Peat

A study made by Ivey F. Lewis, Miller professor of biology in the University of Virginia, and Elton C. Cocke, graduate student, has traced the vegetation to which peat in the Dismal Swamp owes its origin. This was done by identifying some of the preserved pollen grains and other spores that occur in the peat in great abundance.

It was found that when this area first became suitable for the growth of land plants it was a grassy swamp, probably an open meadow type. Invasion by trees followed as the land was built up, so that the meadow passed over into a savannah dotted with copes of pine, willow, hickory, and red gum. As a forest was becoming established at a level 8 feet below the present surface some great catastrophe overtook the vegetation, possibly owing to submergence of the land. This was followed by a great reduction in or even a complete disappearance of the trees, accompanied by a return of grasses and sedges. After this check to the normal vegetational succession, which showed itself most sharply at 7 feet, the forest returned and gradually came to dominate the area as it now does. A second check of a relatively minor nature occurred at 4 feet. This was followed by an unbroken advance toward the closed forest type now dominant. The trees now most abundant in the swamp are black gum, red gum, southern white cedar, red maple, southern cypress, and pond pine.



A \$3,298,000 purchase has brought into Government ownership about 13,000 acres of privately owned land within and adjacent to Yosemite National Park. The expense of the purchase was shared equally by the Federal Government and John D. Rockefeller, jr. The lands thus purchased contain fine stands of sugar pine and western yellow pine. They have been added to the park by presidential proclamation.



The possibility of two plants being produced from a single seed has been proved in the botanical laboratory of the University of Southern California, Science reports. Mrs. Tema Shults Clare, a teaching fellow, in two instances obtained pairs of twin seedlings from Torrey pine seed and in one instance obtained twin seedlings from a piñon seed.

A revision of the white pine blister rust quarantine regulations effective June 5 adds to the list of States and counties designated as infected with the blister rust the State of Montana and the parts of Oregon not previously designated. Surveys during the past year have revealed the existence of infection in northwestern Montana and southwestern Oregon.



The Everglades in the Cape Sable region of Florida are suitable for preservation as a national park, in the opinion of a committee that recently examined the area for the Secretary of the Interior, and the Secretary has announced that he will recommend the area to Congress for approval as a national park project.

The Cape Sable region is 50 miles nearer the equator than any other section of the United States. The committee made their inspection by dirigible and by motor boats and skiffs.



William H. Walker, Greenwich, Mass., has a sawmill that has been operating continuously on the same site for 100 years. Its timber supply has come chiefly from a tract of 2,000 acres that has been conservatively handled by the Walker family during this entire period. Selective logging is practiced with the idea of favoring the young growth and of producing large trees of high quality. Portions of the land have been cut over several times in the last century.

Foreign Notes

Swedish Institute Finds Autumn Unfavorable Season For Sowing Pine Seed

In order to study the results from fall sowing as compared with spring sowing of pine seed in Sweden, the Swedish Institute of Experimental Forestry made experimental sowings in each of the 10 years 1912-1921. Most of the sowing was done in three places chosen as representing different latitudinal divisions of the conifer-forest region of Sweden north of the range of oak. The most southerly of these is situated at $60^{\circ} 45'$ north latitude in the State forest of Ovansjö, Province of Gästrikland; the second, at $62^{\circ} 58\frac{1}{2}'$ north latitude in the State forest of Oxböle, Province of Jämtland; and the most northerly, at $65^{\circ} 47'$ north latitude in the State forest of Alträsk, Province of Norrbotten. These areas are cleared land on which mixed pine and spruce forest previously grew. Their ground cover at the time when they were prepared for sowing consisted mainly of mosses and berry bushes. The soil is composed of morainic materials with podsol profile, overlaid with raw humus of rather good quality. It represents Swedish forest soil of about average type or possibly somewhat above the average.

The method followed was to sow in previously prepared seed spots. All sowings were made with Scotch pine, a fixed number of individual seed being used on each seed spot. Because of the length of time covered by the experiment and of the different latitude of the sowing areas, it was necessary to use 16 different lots of seed; in each of the 10 years, however, the fall sowing on each site was made with seed of the same lot used there in the spring planting of that year.

Spring sowings showed very much better results than fall sowings either of the same year or of the preceding year. The superiority of the spring sowings was apparent both in the percentage of the seed that

germinated, in the average number of plants per spot, in the percentage of seed spots with seedlings, and in germination percentage based on the estimated number of fertile seeds. An examination made in 1926 showed that, in general, results were four times as good on spring-sown as on fall-sown plots on the most southerly area, three times as good on the area occupying a median position, and twice as good on the most northerly area.

In most cases the average of the tallest plants on each seed spot was found in 1926 to be somewhat greater for spring sowings than for autumn sowings of the preceding year. This is attributed to the fact that a considerably greater total number of plants resulted from spring sowing than from fall sowing of a given number of seed, increasing the chance of obtaining trees larger than the average.

Collating these results with those of experiments made by the institute with seed spotting at different times during the summer half-years of 1922 and 1923 at Siljansfors, Province of Dalarne, Edvard Wibeck, director of the Norland branch of the Swedish Institute of Experimental Forestry, finds that in Sweden optimum results from sowing pine seed are obtained by sowing during spring and midsummer. He states that in the north and east portions of Sweden, where summer rainfall is less plentiful and occurs later than in the south and west, the best time for sowing pine seed is at the end of June or even in the first part of July.

While stating that the combination of causes which determines the relative results from spring and fall sowing is too complicated to permit of analysis by means of the rough and ready method of investigation that field sowings and meteorological observations provide, Wibeck refers in this connection to germination experiments previously carried out by K. Wiström with four lots of pine seed described as follows: (1) Seed neither treated with water nor frozen; (2) dry

seed that had been exposed to a temperature of between -5° and 17° C.; (3) seed frozen like the second lot but after being about half saturated with water (its weight being increased by about 20 to 30 per cent as a consequence of soaking for from two to three hours); and (4) seed treated like the third lot but having been fully saturated with water by about six hours' soaking, showing an increase in weight of about 45 to 65 per cent. A 30-day germination experiment indicated that the fertility of the seed samples of lots 2 and 3 was about 70 to 90 per cent as great as that of the untreated seed and the fertility of the seed of lot 4 only 37 per cent of that of the untreated seed. The great decline in fertility shown to take place in pine seed frozen in a very moist state, Wibeck observes, is quite sufficient to explain why autumn sowings are generally inferior to spring sowings in respect to the proportion of plants that come up, since it is evident that autumn-sown seed is generally far more exposed to soaking and freezing before germination than spring-sown seed.

Reforestation Costs in the French War Zone

Bids for the reforesting of 7,000 hectares in the devastated zone near Verdun and Morthomme in France resulted in the placing of the contract at the following rates (specifications call for 4,500 plants to the hectare):

	Francs per hectare
Half black pine and half Scotch pine-----	1,127.68
Half spruce and half hardwoods-----	814.56
Half black pine, one-fourth birch, and one-fourth white alder-----	983.85

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Reforestation operations costing from \$450 to \$1,000 per acre are in progress on denuded mountain sides of Korea, according to information supplied by Japanese foresters of the Korean Forest Experiment Station to Leon M. Estabrook, commissioner in the foreign service of the United States Department of Agriculture. The washing and gullying of vast mountain sides with slopes ranging to 30 per cent is causing enormous damage to river bottoms valuable for agriculture. "Nursery spots" are prepared on the eroded areas by planting herbaceous plants. When the nurse crop is several years old a pine tree is planted on each spot.

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Shipments of cork from Algiers to the United States, which receives a greater portion of the annual export of Algerian cork than any other country, in 1929 totaled 47,280 tons and were valued at \$3,095,320. Shipments from the Palermo district of Sicily to the United States totaled 5,810,000 pounds in 1929 and 2,609,000 pounds in the quarter ending March 31, 1930.

American Forest Trees Popular in South Australia

In South Australia, where Monterey pine is the tree most used for forest planting, a number of other American conifers are popularizing themselves, according to the report of the South Australia Woods and Forests Department for the year ending June 30, 1929. Recent tests with loblolly pine and slash pine have given results such as to convince forestry officials that in future plantings these species may well be substituted in large measure for Monterey pine. Maritime pine is expected to join with these two American species in partially displacing Monterey pine. Douglas fir is mentioned as having given good results in recent tests, and Bishop pine is reported to be displaying remarkable growth in deep sands at high elevations. Seed used in forest nursery sowings made in June of 1929 included 110 pounds of loblolly pine, 92 pounds of western yellow pine, and 50 pounds of longleaf pine.

Monterey pine, popular in South Australia for more than 40 years, was used on 5,620 acres of the total area of 6,069 acres reported by the department as having been planted in the fiscal year 1929.

Forest Fires in Bulgaria

Forest fires in Bulgaria are frequent and disastrous, especially in the coniferous forests that abound in the mountains of that country, according to a Government report of which the Geneva Geographical Society has published a review. Most of the fires are attributed to carelessness; some are of incendiary origin. Roving herders who spend the summer in the mountains frequently set fires of great extent with the purpose of creating new pasturelands. Great areas of forest in Bulgaria are said to have been destroyed by fires spreading across the Turco-Bulgarian frontier. Burned-over areas on the Bulgarian State forests aggregate 17,200 hectares. From 1924 to 1928, 6,000 hectares of Bulgarian land was artificially reforested. A law of 1925 provides for safeguards against forest fires and for forest-fire suppression, but there is still need for more strict enforcement of this law and for the development of greater public consciousness of the importance of forests to the whole country. Last summer King Boris himself took a hand in fighting fire on the forests of Tcham-Koria. Armed with an ax, the sovereign placed himself at the head of a group of soldiers and others and actively led them in cutting trees and clearing a firebreak.

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British Columbia has recently increased the forest protection rate which it levies on lumber operations from $2\frac{1}{4}$ to 4 cents per 1,000 feet, and has raised the Government contribution to the protection fund from \$200,000 to \$480,000.

Personals

W. F. Ramsdell, assistant regional forester of the United States Forest Service in the Lake States region, has resigned to accept appointment to the George Willis Pack professorship of forest land management in the School of Forestry and Conservation, University of Michigan. This professorship, maintained with part of the income from a foundation established by Charles Lathrop Pack in memory of his father, has as its purpose the promotion of practical forest land management through woods work rather than classroom instruction. Mr. Ramsdell received the B. S. and M. F. degrees from the University of Michigan in 1912 and 1914, respectively. He entered the Forest Service as a student assistant, and had served on seven different national forests in the West when in 1924 he was made inspector in forest management in the North Pacific region. He was assigned to the Lake States regional office when it was first organized in May, 1929.

A. R. Watzek, of the Crossett-Western Lumber Co., Portland, Oreg., has been appointed a member of the Oregon State Board of Forestry. He succeeds George L. McPherson, and represents the Oregon Forest Fire Association.

Asher Odenwelder, jr., manager of the Easton Water Co., Easton, Pa., has been appointed a member of the Pennsylvania Forest Commission. He succeeds Henry W. Shoemaker, who resigned from the commission upon being appointed minister to Bulgaria.

Lynn F. Cronemiller has been selected to succeed the late F. A. Elliott as State forester of Oregon. Theodore Rainwater, of the Coos County Fire Patrol Association, has been chosen to succeed Mr. Cronemiller as deputy State forester.

S. H. Marsh, who last year resigned from the United States Forest Service as district inspector for Clarke-McNary work in the Southeastern States to become vice president and general manager of the Ford Motor Co. at Staunton, Va., is now connected with the Virginia Commission on Conservation and Development. His new duties have to do with the acquisition of land for the proposed Shenandoah Park.

Paul J. Fair has resigned his position in the San Francisco office of the United States Forest Service, where he has been in charge of exhibit and motion-picture work for the past 10 years, and is now connected with the Montana Fish and Game Commission, for which he will make a series of wild-life motion pictures.

Howard J. Eberly is now district inspector in charge of Federal cooperation under the Clarke-McNary law in the Gulf States. Mr. Eberly, who received the B. S. degree in forestry from the Oregon State College in 1911, has had long experience in forest fire control activities as a member of the State forestry organizations of Texas and Oregon. Recently he has had charge of the administration of the Oregon forest taxation law. His headquarters are at New Orleans.

Samuel J. Record will represent the Yale School of Forestry at the International Botanical Congress to be held at Cambridge, England, August 16-23, and will open the proceedings of the First International Conference on the Systematic Anatomy of Woods, which is to be held in conjunction with the congress.

E. O. Siecke, director of the Texas Forest Service, has leave of absence for the months of June, July, and August, and is traveling in Europe. His plans included some travel in company with a group of forestry students from Oxford.

T. W. Norcross, chief engineer of the United States Forest Service, sailed June 4 for travel in Europe with the purpose of obtaining information that may facilitate the handling of water-power and other hydraulic work of the Forest Service. Mr. Norcross expected to confer with engineers and visit hydraulic developments in a number of countries, particularly Germany, Norway, and Sweden. Between June 27 and July 9 he was to attend the meetings of the International Electrotechnical Commission, in Stockholm, at which he was to participate in efforts toward international agreement on a method of giving stream-flow ratings to rivers.

F. G. Wilson has resigned as extension forester of Wisconsin to take charge of forest protection work under the Wisconsin Conservation Commission.

Charles R. Lockard is now assistant State forester of Vermont. Mr. Lockard is a graduate of the New York State College of Forestry and of the Harvard Forest School. He has had several years' experience as forester for the Diamond Match Co. in New England.

N. S. Rogers, for several years district warden for the fire patrol association of Columbia County, Oreg., has accepted a position with the State tax commission the duties of which are to assist county assessors in valuation of timber and of logging equipment and mill property. He is succeeded as district warden by E. A. McDonald.

Harold C. Bryant, of Berkeley, Calif., has been appointed head of the new branch of education and research in the National Park Service. He will have the title of assistant to the director and will be stationed at Washington, D. C. Doctor Bryant has served as economic ornithologist of the California Museum of Vertebrate Zoology and has for many years had charge of the educational and research work of the California Fish and Game Commission. He took part in the initiation of educational work in the national parks 10 years ago, when he helped to establish the nature guide service in Yosemite National Park.

Ralph W. Hussey, for eight years connected with the office of range management in the Albuquerque, N. Mex., office of the United States Forest Service, has been made supervisor of the Apache National Forest, Ariz., filling the vacancy left by the resignation of K. C. Kartchner.

Edwin C. Jahn has accepted appointment as associate professor of forestry, University of Idaho. Doctor Jahn received the bachelor's and master's degrees from the New York State College of Forestry and the doctor's degree from McGill University, and at present is studying in Sweden under an industrial fellowship granted by the American-Scandinavian Foundation. His major work has been in the field of cellulose chemistry and his minor in plant anatomy and wood technology. He will assume his new duties August 1.

K. A. Salman, formerly with the Massachusetts Agricultural College, has been appointed agent at the Palo Alto, Calif., station of the United States Bureau of Entomology.

H. Y. Forsythe has resigned as district forester of the Tygart district, West Virginia, to become assistant supervisor of the Stokes State Forest of New Jersey, at Branchville, N. J.

Bibliography

The Plant in Relation to Water

By E. N. MUNNS, United States Forest Service

Plant physiology, particularly that part of plant physiology which treats of the use of water, is one of the foundation stones of silviculture; yet physiology receives little attention from the average practicing forester. In general, scholastic training in the subject has been inadequate, partly because of the lack of reliable texts and because references giving an account of the more recent advances in this field have not been readily available. It is, then, a pleasure to be able to recommend most earnestly N. A. Maximov's book, *The Plant in Relation to Water*, now available in an authorized English translation.²

In this work, which appeared in Russian in 1925, Maximov set himself the task of presenting in one volume a full account of the existing knowledge of drought resistance in plants, preceded by a discussion of the principal laws governing the absorption and transpiration of water. That this was a large order is evidenced by the mass of material on drought resistance that has been published in recent years. The author has made a very careful selection of his material, and writes well and lucidly.

In the translation, which was edited by R. H. Yapp, late Mason professor of botany in the University of Birmingham, England, Maximov has cut out two of his chapters on water transference, explaining that a detailed treatment of this important subject by him has been rendered unnecessary through the excellent treatment given it by H. H. Dixon. (Dixon's theory

as to the cause of sap movement to the tops of tall trees is based on the cohesive force of water in small tubes.)

Of more than passing interest is the fact that Maximov, in his work at Tiflis, Union of Socialist Soviet Republics, discovered experimentally, as did Briggs and Shantz in Colorado, that solar radiation is the principal factor in determining the rate of transpiration, with humidity of secondary importance and air movement of much less influence. Maximov represents the land plant as a sort of wick along which a continuous stream of water escapes from the soil into the atmosphere. He points out that the total water content of a plant at any one time is small in comparison with the total quantity that may pass through it in a single day, the leaves of some plants being able, even under shade conditions, to replace the whole of their water in the space of one hour. Either high solar radiation, dry air, or low moisture supply exerts an influence toward the production of leaves smaller and thicker and having more and larger veins than leaves developed under the contrasting condition. The author distinguishes between atmospheric drought causing temporary wilting and soil drought producing permanent wilting. The most disastrous condition prevails when both occur, as is frequently the case on our Great Plains and on the steppes of Russia. In Maximov's opinion the basis of drought resistance is to be found in the capacity of the individual plant, or the variety, or the species to endure wilting. If this is so, he remarks, the internal physicochemical properties of the protoplasm would appear to play the principal rôle in drought resistance.

² George Allen & Unwin (Ltd.), London, 1929.

Georgia Landowners Believe that Timber Growing is Profitable

By C. F. EVANS, United States Forest Service

To anyone about to engage in a new enterprise, probably nothing else is quite so encouraging as the knowledge that efforts of others along the same line have been successful. One good example of successful practice is worth more than a great deal of exhortation. *Profitable Forestry in Georgia*, Bulletin 10 of the Georgia Forest Service, by C. A. Whittle, should therefore prove a valuable aid in stimulating Georgia citizens to greater activity in forestry. This illustrated bulletin of 40 pages is one of a series, each dealing with a single phase of forestry, and is similar in its general plan to *Growing Pine Timber for Profit in the South*, Miscellaneous Publication No. 24 of the Forest Service, United States Department of Agriculture, except that it deals with cases in Georgia only.

One could hardly find in the entire United States another region from which so many examples of good forest practice by private owners could be drawn as from south Georgia and north Florida. Not all the 28 cases cited in the bulletin, however, are found in the slash pine and longleaf pine types. The Piedmont shortleaf and Appalachian hardwoods also are well represented. In his introduction the State forester correctly states that "only a few of the many reports that could have been obtained are given herein." One is reminded of the prediction made by Austin Cary in the Department of Agriculture publication previously referred to, "Much of the country will be a timber garden, a Mecca for foreigners interested in that way." While this prophecy is a long, long way from fulfilment, many of the first steps have been taken and there is no dearth of such good examples of sound forest practice as are described in the Georgia bulletin.

It is to be hoped that a succeeding edition, promised by the State forester in his introduction, will show more definite figures on financial returns from forest management. Such figures will no doubt be difficult to obtain; but a number of these same landowners have roughly calculated their returns. More definite statements concerning plans of management would add to the effectiveness of the publication. It is interesting, and encouraging, to note the frequent reference to thinning and even pruning operations in slash and longleaf pine.

The statement (p. 6) that "even where no effort at forest management is made there are 1½ to 2½ cords growth per acre annually" seems unduly optimistic, even for the rapidly growing southern pines. Probably it would be a rare case in which the growth would come within this range without good management. On page 7 the author estimates that because of lack of management the average annual growth on 23,000,000 acres of forest and semiforest land in Georgia is less than one-half cord per acre.

The bulletin is well illustrated and is written in a clear, readable style. It should prove a valuable addition to the list of Georgia Forest Service publications designed for general distribution.

Lumber, Lath, and Shingle Production in 1928

The twenty-fifth in the series of annual reports on lumber production in the United States published cooperatively since 1904 by the Bureau of the Census and the Forest Service is now available. The report covers the 1928 production of 13,268 mills, each of which sawed more than 50,000 feet of lumber, or the equivalent in lath or shingles, during that year. The total production of these mills was 34,142,123,000 board feet of lumber, 1,903,887,000 lath, and 5,603,690,000 shingles. The reports made by the mills for 1928 indicate a lumber production 1.1 per cent less than that indicated by returns received for 1927. The 1927 returns as compared with those of 1926 indicated a 6.5 per cent decrease. Statistics compiled by the Bureau of Statistics of the Interstate Commerce Commission show a corresponding decrease in shipments of forest products originated by Class I steam railroads (those with annual operating revenues above \$1,000,000).

The most important lumber areas, from the standpoint of production, are the North Pacific States (Washington and Oregon) and the Southern States (Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas, Oklahoma, and Texas). The former group took the lead in 1928 for the first time, producing 34.3 per cent of the national output of lumber. The Southern States had held the lead for a quarter century. The Southern States group plus the North Carolina pine States—North Carolina, South Carolina, and Virginia—produced 40.9 per cent of the country's total as compared with 40 per cent produced by the North Pacific States plus California and Nevada.

The production of more than 1,000,000,000 board feet of lumber in 1928 was reported by each of the States of Alabama, Arkansas, California, Georgia, Louisiana, Mississippi, North Carolina, Oregon, Texas, and Washington, the principal species cut being western yellow pine in California, Douglas fir in Washington and Oregon, southern yellow pine in each of the other seven States. Southern yellow pine, Douglas fir, western yellow pine, hemlock, oak, and white pine³ contributed more than 1,000,000,000 board feet each to the total lumber cut in 1928. The cut of southern yellow pine was nearly one-third of the total cut in 1928, as in 1926 and 1927. Douglas fir, the nearest competitor of southern yellow pine, has contributed nearly one-fourth of the cut in each of the three years.

³ Including all "northern pine," which is often a mixture of northern white pine, Norway pine, and jack pine.

The bulletin, *Forest Products: 1928—Lumber, Lath, and Shingles*, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents a copy.

Logging Waste in the Douglas Fir Region

Sound wood of cordwood size or larger that is left by the loggers as waste in the Douglas fir forests of the Northwest amounts each year to 3,088,748,000 board feet, according to the results of a study by Allen H. Hodgson, United States Forest Service. This waste constitutes about one-fifth of the volume of the Douglas fir stands cut each year and is the equivalent of almost one-tenth of the lumber produced annually in the United States. On the average acre, it was found, the loggers leave 21,407 board feet of sound material of cordwood size or larger, about half of which is small and large saw logs. Mr. Hodgson's survey, made in the years 1926-1929, covered 24 representative lumbering operations in western Oregon and Washington.

Reasons for this waste, in addition to economic forces and present logging methods, include topographical factors, injury to standing and down timber due to fungi and insects, fire damage, and the action of wind and sleet storms.

The report on this study was published serially during 1929 in two trade journals, the *Pacific Pulp and Paper Industry* and the *West Coast Lumberman*, and has since been published in the form of a 42-page bulletin illustrated with photographs and charts. A small number of copies of the bulletin, which is entitled "Logging Waste in the Douglas Fir Region," are available for free distribution by the regional forester, Portland, Oreg.

Major Soil Divisions of the United States

A handy little volume that will enable the forester to become better acquainted with the broad classification of soil types and the relation of these types to climate, geography, and forests is the *Major Soil Divisions of the United States*,⁴ by Louis A. Wolfanger, economic and soil geographer, Columbia University. This volume of 139 pages presents in a form adapted to the understanding of the general reader the newer philosophy with regard to soil attributes, soil definition, and soil distribution. Whereas soil classification was formerly based on the theory that the characteristics of soil correspond closely with the properties of the geologic formations from which the bulk of their material is derived, the new concept gives first attention to the properties of the soils themselves, irrespective of their origin.

Climatic Influences on Growth and Seed Production of Scotch Pine in the Netherlands

By E. N. MUNNS, United States Forest Service

Of particular interest to foresters is a paper by E. Hesselink, director of the Royal Forest Experiment Station of the Netherlands, on certain ecological factors in relation to the Scotch pine, a pine which in Europe is a tree of real merit although in America it has shown more limited forestry value. Doctor Hesselink treats of the ecology of the tree on the basis of his work with it in the Netherlands. A dry summer was found to be unfavorable to both diameter and height growth of Scotch pine and a dry spring (May and June) appeared to have a stimulating effect on its growth. The sea wind, resulting in high evaporation, is mentioned as an influence favoring spring growth.

Of even greater interest to American foresters is Doctor Hesselink's attempt to establish a relationship between weather conditions and seed years. The weather during the late summer (August) when the flower buds are first formed is the critical period, he believes. He shows that the Augusts of 1913, 1918, and 1921 were abnormally dry, and that 1915, 1920, and 1923 were good seed years. The low production of seed in 1914, 1919, and 1925 is ascribed to the wet and cold weather of August in 1912, 1917, and 1923. The favorable influence of a good August, he points out, may be neutralized by unfavorable weather during the flowering period; for example, the poor seed years of 1924 and 1927 are explained by the wet, cold Mays of 1923 and 1926.

While the author's conclusions in this connection are of interest, in my opinion the weather conditions at the time of flowering have a more important bearing on seed production of wind-pollinated trees than those at any other time. Frost, sleet, fog, rain, drought—all may greatly influence the development of the flower into fruit. It seems desirable to point out that the lack of adequate phenological observations in America is retarding greatly the development of our knowledge as to what causes determine the incidence of the so-called "seed years." Such knowledge is greatly needed as a guide in collecting seed and in storing seed for use in periods when little seed is produced. The need of it is felt with especial keenness in view of the present interest in reforestation, and in connection with such circumstances as the failure of the Douglas fir seed crop over the greater part of the tree's range for several successive years and the apparently poor quality of the heavy crop of Norway pine seed collected a year or two ago. Only when American foresters begin systematically to observe and record the behavior of trees shall we be able to learn what really influences seed production and so be able to meet our forestation demands on a systematic basis.

(*Mededeelingen van het Rijksboschbouwproefstation. Deel III. Aflevering 3, 1928. pp. 357. With summaries in French.*)

⁴ John Wiley & Sons (Inc.), New York, 1930.

Cork Oak for California

The growth of individual cork oaks at a number of widely scattered locations in California indicates that this exotic may have value for watershed protection there, according to a report made to the Sacramento Region Citizens' Council in 1929 by its committee on cork oak. In its report, which was prepared by Woodbridge Metcalf, the committee did not undertake to predict very large financial returns from the growing of cork oak on California foothill lands. As a possible value second in interest to watershed protection it mentioned the beauty which forests of cork oak, if adequately protected from fire, might contribute to lands now largely barren.

J. E. Morrow, in charge of the work at Chico, Calif., of the Office of Foreign Plant Introduction, United States Bureau of Plant Industry, says:

It has been demonstrated over a period of years that the cork oak is very well adapted to the Sacramento Valley at least * * *. It will grow over a wide range of soils and even on thin red soils, but it makes the best development on the rich river bottom lands. * * * It is better to plant the acorn where the tree is to grow, as it is an evergreen and does not transplant readily. It makes a very pretty avenue or street tree when properly trained. There is no doubt but what this oak could be grown well up into the foothills to an elevation of possibly 2,000 or more feet.

Mr. Morrow describes some trees planted on the R. E. Fields place at Biggs, Calif., set out about 40 years ago by John Rock, president of the California Nursery Co., which have attained heights of approximately 30 or 35 feet and diameters of 4 feet.

On the McGill ranch near Oakville, Napa County, about 50 cork oaks now approximately 45 years old have survived from a planting said to have been made with acorns brought from Europe by a former owner of the property. When trees in this plantation were measured in January, 1929, one was found to be 25.4 inches in diameter at breast height and 37 feet in height. This tree was situated on bottom land along an irrigation ditch. The other trees so situated of which measurements were taken averaged about 17 inches in diameter and 20 to 24 feet in height. Of the trees growing on a rocky hillside with very shallow soil some were very scrubby, with diameters of from 5 to 8 inches and heights of from 12 to 14 feet. A good number of small trees were starting up near the old ones along the irrigation ditch, but there was no evidence of natural reproduction on the hillside.

Cork oak has been used extensively for street and highway planting in southern California, particularly in Los Angeles County.

A successful plantation of cork oak was developed at the Chico Forestry Station, Butte County, now a part of Bidwell Park of the city of Chico, by planting acorns 6 by 6 feet apart on thin, gravelly red soil and cultivating during the first few years to keep down the

weeds. Measurement of the trees in this plantation at the age of 21 years gave the following figures:

Trees per acre	number	383
Average diameter at breast height	inches	5.5
Average height	feet	24
Diameter of largest tree	inches	14.6
Height of largest tree	feet	39

All the trees in this plantation, it is reported, have a good coating of fluted, corky bark. The plantation bears some acorns almost every year and usually bears a good crop.

D. Fricot, who started a plantation of more than 200 cork oaks near Angels Camp, Calaveras County, in the spring of 1928, reported that trees 12 to 14 inches high developed in one year from acorns sown in the field.

Cork oak trees in California are apparently practically free from diseases, the report indicates. A powdery mildew has appeared on a few trees, but this can be controlled by dusting with dry sulphur. Slight attacks by oak twig borers and another minute insect have been noted in Los Angeles County. The oak moth, which causes serious defoliation of the native coast live oak, has occasionally been found attacking the leaves of cork oak. This can easily be controlled by using a lead arsenate spray while the caterpillars are small. When acorns of cork oak are sown in the field they must be protected from ground squirrels and other rodents. Gophers seem to be particularly fond of cork oak roots.

No systematic stripping of entire trees or groups of trees could be reported on, hence evidence was lacking as to the suitability of bark from California cork oaks for commercial purposes.

The report by Mr. Metcalf, including a discussion of the growing and utilization of cork oak in foreign countries, was published in the October, 1929, number of the Monthly Bulletin, California Department of Agriculture.

Smithsonian Bulletin Predicts New Method of Forecasting Weather

In a 49-page bulletin entitled "The Atmosphere and the Sun," just issued by the Smithsonian Institution, Washington, D. C., H. Helm Clayton gives a condensed account of the results of 20 years' research on the relation of the sun's activity to atmospheric changes, and discusses the possibility of forecasting weather on the basis of study of variations in solar activity. C. G. Abbot and his associates in the Smithsonian Astrophysical Observatory have found evidence of complicated pulses of the sun's radiation occurring both as changes over periods of years and as shorter variations of only a few days' duration. These pulses, Mr. Clayton states, are attended by variations in atmospheric pressure, which affect the circulation of the atmosphere.

New Senate Document on Flood Waters of the Mississippi

An 80-page report entitled "Flood Waters of the Mississippi River" prepared for the National Flood Commission by the Research Service (Inc.), Washington, D. C., has been published as Senate Document No. 127, Seventy-first Congress. In the preface Walter Parker says:

With a definite goal in mind, competent engineers can and will plan in such a way as to work with, instead of working against, nature.

To this end the full cooperation and active services will be required of the experts of the Agricultural Department on forestry, soil porosity, soil erosion, soil moisture; of the Interior Department on irrigation, drainage, and the conservation of natural resources; of the Power Commission on power; of the War Department on channel improvement and navigation; of the Department of Commerce on transportation, trade, and communications; of the States, localities, and business enterprise on cooperation and the sharing of costs.

National Parks of the World

An article in the January, 1930, *Revue des Eaux et Forêts* entitled "A l'Académie des Sciences—Les Parcs Nationaux," by Louis Mangin, president of the academy, contains a brief discussion of national parks throughout the world. Countries mentioned as having parks or similar reserves are the United States, Canada, New Zealand, Australia, South Africa, the Belgian Congo, the British and Dutch East Indies, Burma, Japan, England, Switzerland, Italy, Sweden, Poland, Czechoslovakia, Germany, Austria, and Madagascar. Professor Mangin urges the carrying through of the project discussed at the Pan Pacific Congress at Java last year of an international organization for the protection of natural beauties and of flora and fauna. He also urges immediate steps to save important areas under French administration, such as the islands of Crozet, Saint Paul, and Amsterdam, by converting them into national parks.

A New Ecological Journal

Arrangements have been completed between the Ecological Society of America and Duke University for the establishment of a new quarterly journal to be known as Ecological Monographs, which will begin publication in January, 1931. The Ecological Society becomes responsible for appointing all but one of the editorial board and for the editorial policy of the new series. Duke University will be represented by one member of the editorial board and will assume charge of publication and of financial matters. The society has elected as editor A. S. Pearse, Duke University. Barrington Moore, editor of *Ecology*, is ex officio associate editor

of Ecological Monographs. Elected associate editors are H. A. Gleason, Brooklyn Botanical Garden; J. E. Weaver, University of Nebraska; E. N. Transeau, Ohio State University; R. N. Chapman, University of Minnesota; R. E. Coker, University of North Carolina; and Chancey Juday, University of Wisconsin. It is proposed to publish in the new journal papers from 25 to 100 printed pages in length, which are too long for *Ecology*, the society's older journal. The board of editors will consider scientific manuscripts dealing with any aspect of ecological investigation, including such practical fields as horticulture, economic entomology, and forestry, but will not consider technical papers dealing solely with economic problems.

Sustaining members of the Ecological Society will receive Ecological Monographs without increase in dues, just as all regular members now receive *Ecology*. The subscription price will be \$6 per annual volume of about 500 pages.

Recent Books and Pamphlets

- Busse, J.: *Forstlexikon*, vol. 1. 3rd ed. illus. P. Parey, Berlin, 1929.
- British Empire Forestry Conference: *Third British Empire Forestry Conference, Australia and New Zealand, 1928, proceedings.* 309 pp. Canberra, 1929.
- Cheyney, Edward G.: *Sylvics: A textbook for college classes.* 149 pp. Burgess-Roseberry Co., Minneapolis, Minn., 1929.
- Compton, Wilson M.: *Orderly control of lumber production and distribution in the lumber industry.* 14 pp. National Lumber Manufacturers Association, Washington, D. C., 1930.
- Craighead, F. C., and Middleton, William: *An annotated list of the important North American forest insects.* 30 pp. (U. S. Department of Agriculture miscellaneous publication no. 74.) Washington, D. C., 1930.
- Dana, Samuel T.: *Forest fires in Maine, 1916-1925.* 73 pp. maps, diagrs. (Maine Forest Service bulletin no. 6.) Augusta, Maine, 1930.
- Dengler, Alfred: *Waldbau auf ökologischer Grundlage: ein Lehr- und Handbuch.* 560 pp. illus., diagrs. J. Springer, Berlin, 1930.
- Detwiler, Samuel B.: *Black currant spreads white-pine blister rust.* rev. ed. 8 pp. illus. (U. S. Department of Agriculture miscellaneous publication no. 27.) Washington, D. C., 1930.
- Eriksson, Jakob: *Fungous diseases of plants in agriculture, horticulture, and forestry.* 2nd ed. 526 pp. illus. Baillière, Tindall & Cox, London, 1930.
- Fry, Walter, and White, John R.: *Big trees.* 114 pp. illus. Stanford University Press, Stanford University, Calif., 1930.

- Gabrielson, Ira N., and Horn, E. E.: Porcupine control in the Western States. 8 pp. illus. (U. S. Department of Agriculture leaflet no. 60.) Washington, D. C., 1930.
- Griffith, B. G., and others: The evolution of soils as affected by the old field white pine-mixed hardwood succession in central New England. 82 pp. diagrs. (Harvard Forest bulletin no. 15.) Petersham, Mass., 1930.
- Hiley, Wilfred E.: The economics of forestry. 256 pp. diagrs. Clarendon Press, Oxford, England, 1930.
- Jacoby, Henry S., and Davis, Roland P.: Timber design and construction. 2nd ed. 334 pp. J. Wiley & Sons, New York, 1930.
- Kirkwood, Joseph E.: Northern Rocky Mountain trees and shrubs. 340 pp. illus. Stanford University Press, Stanford University, Calif., 1930.
- Kroodsma, R. F.: Forest planter's handbook, Michigan 4-H forest rangers. 19 pp. illus. (Michigan State College of Agriculture and Applied Science, extension division club bulletin no. 19.) East Lansing, Mich., 1929.
- Marckworth, Gordon D., and Moore, R.: Management of farm woodlands in Louisiana. 21 pp. illus. (Louisiana State University, agricultural experiment stations bulletin no. 209.) Baton Rouge, La., 1930.
- Metcalf, Woodbridge: Cork oak: A forest tree with possibilities for California. 23 pp. illus. California State Printing Office, Sacramento, Calif., 1929.
- Pennsylvania Department of Forests and Waters: A guide to forestry studies and demonstrations on the Mont Alto and Michaux State Forests. 93 pp. illus. (Research bulletin 1.) Harrisburg, Pa., 1930.
- Prescott, Herbert F.: Municipal or community forests: Their importance as a source of future timber supply, for the conservation of wild life, and for recreational use. rev. ed. 49 pp. illus. New York Conservation Department, Albany, N. Y., 1929.
- Trenk, Fred B.: Sweet gum in Maryland: A handbook for growers and users. 75 pp. illus. Maryland Department of Forestry, Baltimore, Md., 1929.
- West Virginia Commercial Forestry Conference: Proceedings. 152 pp. illus. Charleston, W. Va., 1929.
- Wilkinson, T. L.: Forestry in southern Rhodesia: The utilization of wood; preservation of Rhodesian timbers. 16 pp. illus. (Rhodesia Department of Agriculture and Lands bulletin no. 769.) Salisbury, 1930.
- Yale University School of Forestry: The first thirty years of the Yale School of Forestry: In commemoration of the third decennial reunion at New Haven, Conn., 1930. 59 pp. illus. New Haven, Conn., 1930.
- Allgemeine Forst- und Jagdzeitung, April, 1930.—Internationale kongress forstlicher versuchsanstalten vom 21. bis 27. Juli 1929 in Stockholm, by Vanselow, pp. 152-157. May, 1930.—Die forstliche bewegung in Italien von 1913 bis 1927, by A. Cotta, pp. 179-187.
- American Forests and Forest Life, May, 1930.—The final disposition of the public domain, by H. S. Graves, pp. 263-266. June, 1930.—Conference advances new ideals in forestry: Annual meeting of the American Forestry Association, pp. 336-342.
- Centralblatt für das Gesamte Forstwesen, 1930.—Die bedeutung von klima und witterung für den lebensablauf und die entwicklung von insekten, by E. Schimitsehek, pp. 99-113.
- Forestry Chronicle, February, 1930.—Spruce regeneration in eastern Canada and northeastern United States, by M. Westveld, pp. 22-33; The influence of weather on the inflammability of forest fire fuels, by J. G. Wright, pp. 40-55.
- Forstwissenschaftliches Centralblatt, April, 1930.—Holzzuwachs und witterung, by H. Knuehel and W. Bruckmann, pp. 380-403.
- Journal of Ecology, February, 1930.—Studies of climate and soil in relation to forest management in the southwestern United States, by G. A. Pearson, pp. 139-144.
- Journal of Forestry, February, 1930.—Cooperative control; a proposed solution of the forest problem, by W. Shepard, pp. 113-120; Our future forest needs, by W. M. Compton, pp. 138-146; Our future forest needs, by E. H. Clapp, pp. 147-153; The extension of the public forests, by L. F. Kneipp, pp. 154-165; Expansion of our public forests, by H. S. Graves, pp. 166-177.
- Journal of the Linnean Society, April 24, 1930.—Biology of wood-rotting fungi common in forest areas, by S. R. Bose, pp. 417-438.
- Nature Magazine, May, 1930.—Where white pine once was king, by R. Zon, pp. 310-313, 341, 342.
- Paper Industry, May, 1930.—Logging waste, by A. H. Hodgson, pp. 298 b-e.
- Quarterly Review, January, 1930.—Forest resources of the Empire, by R. E. Turnbull, pp. 178-188.
- Schweizerische Zeitschrift für Forstwesen, April, 1930.—Über die 7. versammlung des Internationalen verbandes forstlicher versuchsanstalten in Schweden, 14. Juli bis 3. August 1929, by P. Flury, pp. 121-138.
- Timberman, May, 1930.—Fire-damaged logs: The loss, by M. Bradner and I. V. Anderson, pp. 38-44.
- Tharandter Forstliches Jahrbuch, 1930.—Über die grundlagen der forstwirtschaft im sächsischen Erzgebirge, by E. Wiedemann, pp. 245-294.

Articles in Periodicals

Zeitschrift für Forst- und Jagdwesen, April, 1930.—Zur
frage der messung der wirtschaftlichen leistungs-
fähigkeit des waldes, by H. Krieger, pp. 219-232.

Recent Publications of the Forest Service

Farmers' Bulletins: 1210-F, Measuring and Marketing
Farm Timber (revised); 1486-F, Longleaf Primer
(revised); 1628-F, Growing Black Locust Trees.

Technical Bulletins: 92-T, The Economic Aspects of
Forest Destruction in Northern Michigan; 166-T,
Timber Growing and Logging Practice in the North-
east; 171-T, Principles of Box and Crate Construc-
tion.

Circular 105-C, Knotty Lumber for Boxes.

Leaflets: 56-L, Preventing Cracks in New Wood
Floors; 58-L, Making a Model to Show How Forests
Prevent Erosion.

National Forest Map Folders: Sitgreaves, Timpanogos
Cave, Umpqua.

National Forest Administrative Maps: $\frac{1}{4}$ -inch, Cleve-
land, Umpqua; $\frac{1}{2}$ -inch, Pend Oreille (4-color), Ab-
saroka, Crater, Rainier, and Umatilla. Map of
western Colorado covering several national forests.

National Forest Proclamation Diagrams: Arapaho,
Cochetopa, Gunnison, Pike, and Routt.